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ABSTRACT

The 17 papers were originally presented at a 1977 series of workshops for personnel serving the deaf-blind and severely handicapped and are organized into the following workshop topics: programing and program development, the senses, cognition, communication, and behavior managment. The papers have the following titles and authors: "Education for the Severely Handicapped - What is It?" (O. Peak); "Program Outreach, Services for Deaf-Blind Children in Rural Areas" (J. Dominguez); "The Design of Instructional Programs for Severely Multihandicapped Students" (J. Writer); "Assessment and Remediation of Multihandicapped Children" (M. Wood); "Application of Audiological Principles to the Deaf-Blind Child" (R. Roeser); "Visual Development" (M. Efron); "Workshop in Vision Stimulation and Training" (K. Shane); "Sensory Stimulation, Sensory Integration Theory" (G. Stone); "Sensory Stimulation, Sensory Integration - Techniques and Equipment" (M. Dodd); "Sensorimotor Cognitive Assessment and Curriculum for the Multihandicapped Child" (N. Fieber); "Prelanguage Development - Communication Training for the Deaf-Blind" (R. Condon); "Communication Development" (S. Soltman); "Nonvocal Communication" (K. Dorsey); "Approaches to Nonoral Communication" (N. Harlan and F. Carlson); "A Discussion of Behavior Modification Procedures as Applied to the Severely and Profoundly Handicapped" (D. Duncan); "Behavior Management of the Severely Profoundly Handicapped Child" (J. Harris); and "Behavior Analysis" (H. DeShong). (PHR)

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EDUCATIONAL METHODS FOR DEAF-BLIND AND SEVERELY HANDICAPPED STUDENTS

VOLUME I

TEXAS EDUCATION AGENCY
DEPARTMENT OF SPECIAL EDUCATION
SPECIAL EDUCATION DEVELOPMENTAL SERVICES
CENTER FOR DEAF-BLIND

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Introduction

The papers contained herein were collected from presentors at the fall 1977 series of workshops conducted jointly by the Texas Center for Deaf-Blind and the 20 regional education service centers in the state of Texas. The workshops were organized and conducted to respond to the top priority inservice needs of educators working with deaf-blind and severely handicapped students. The papers are published in the hope that educators who participated in the workshops will be reminded of the knowledge and interest that was represented, and that educators not present at the workshops will find some new ideas for working with deaf-blind and severely handicapped students.

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Fall 1977 Workshops for Personnel Serving Deaf-Blind and Severely Handicapped

November 17-18, 1977: Lubbock, Texas

- Vision Stimulation and Training - Karen Shane
- Sensory Stimulation - Gretchen Stone
- Behavior Management - Jan Writer

December 6-7, 1977: Dallas, Texas

- Education for the Severely Handicapped - Orel Peak
- Language Training - Sue Soltman
- Behavior Management - Dr. Dee Duncan
- Nonvocal Communication Techniques - Kitty Dorsey
- Auditory Training - Ross Roeser

December 12-13, 1977: Austin, Texas

- Behavior Analysis - Dr. Hal DeShong
- Adapting Cognitive Assessment and Curriculum for Multihandicapped Children - Nancy Fieber
- Early Communication for Deaf-Blind Children - Ray Condon
- Approaches to Non-Oral Communication - Nancy Harlan
- Language Assessment and Intervention with Higher Functioning Deaf-Blind Children - Dr. Mary Lovey Wood

January 18-19, 1978: San Antonio, Texas

- Overview of Deaf-Blind Education: Assessment and Programming - Jan Writer

January 18-19, 1978: San Antonio, Texas (continued)

- Behavior Management of the Severely Handicapped Child - Dr. Jack Harris
- Approaches to Multihandicapped Visually Impaired Children - Dr. Marvin Efron

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PROGRAMMING AND PROGRAM DEVELOPMENT

EDUCATION FOR THE SEVERELY HANDICAPPED: WHAT IS IT?

Orel Peak

Providing programs for the severely handicapped is one of the great challenges in American education today. Those serving in the field are aware of the many problems, frustrations, and anxieties that are encountered by the handicapped child, its parents, the staff personnel of the child's school, and supportive agencies. From birth throughout life, demanding adjustments are a part of the handicapped child's daily living. A well-adjusted life style is achieved by dedication and diligence, not only on the part of the handicapped child but also for those who function in supportive roles.

Programs devised to assist handicapped persons through the developmental stages of life should be directed by informed personnel who display functional management and innovative skills.

The biology of human development is basic to the well-managed program. Being acquainted with diagnosis suggests certain expectations for each case being studied. The effects of handicapping conditions will impose limitations that must be reckoned with as the individual moves through the developmental stages of life.

The effects of early attempts at socialization are strongly shaping. Functioning as the group it is, the family norms, values, and attitudes give direction to personality development. Reality orientation, as well as acceptance or rejection, often appear as obstacles to desirable adjustment goals.

When the family seeks the services of the school, an activation should proceed which is soundly based on philosophy and understandings which give rise to educational strategies pertinent to the needs of the individual. Properly moderated, a functional educational system will provide the handicapped student with language and communicative skill development, academic skill development, personal-social development, and vocational development through the developmental years. In addition, it will provide the family with information concerning available support programs.

Throughout the educational process, observations, innovations, and modifications should be applied to each individual. Learning tasks should be scaled to the needs and abilities of the learner. Educators should look to developing technologies as possible sources of application.

Evaluation should be a continuous, on-going process. From evaluation sound procedures can be confirmed, while nonproductive procedures can be further studied or rejected.

Staff training and development can be approached on a day-to-day basis as time and opportunity are available for problem review and tactical considerations. The atmosphere is cultured toward staff growth through experiencing success with problems and by demonstrating the analysis of failure for purposes of regrouping forces and formulating new strategies.

Succinctly stated, education for the severely handicapped is a service provided to assist with developmental needs. It is individually oriented and directed to the specific needs of individuals. It is a professional service offered and monitored by trained personnel whose interests and personal qualifications are joined with others with different training to form a functioning team. In conclusion, the total operation is supportive of individual rights and responsibilities and seeks to promote humanistic concerns for all who work together in the school.

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PROGRAM OUTREACH
SERVICES FOR DEAF-BLIND CHILDREN IN RURAL AREAS

Jerry Dominguez

In 1970 a pilot study was undertaken in the state of New Mexico to obtain a list of names of suspected deaf-blind children. The task was undertaken by Mountain Plains Regional Center Services for Deaf-Blind Children and a consultant for New Mexico. The plan called for the two resource persons to meet with local agencies, hospitals, medical personnel, the welfare department, health department, state institutions, and any other resources in the state which provided services to handicapped children. This initial screening effort resulted in a list of 107 suspected deaf-blind children in the state.

The finding of this large suspected population of deaf-blind children allowed additional funds to be made available, through the existing deaf-blind grant in New Mexico, to hire two outreach workers. The outreach workers contacted all the agencies that had made referrals to the resource persons involved in the pilot study. The children and their families were contacted to determine eligibility for deaf-blind services. The children were screened, visually and auditorily, in the home. Appropriate referrals were then made to an ophthalmologist and audiologist. The outreach person also obtained and reviewed the child's medical/educational records. Because of the large number of children involved, this task was slow, laborious, and expensive.

The list was gradually reduced as the outreach workers determined that some of the children were ineligible; these children were referred to local agencies that could meet their needs. However, a number of children remained questionable. Because of the expense involved and the limited professional resources available in the state, the necessary extensive workups were slowly obtained. The children who remained questionable were maintained as suspected deaf-blind children until further evaluation determined otherwise. For children who were certified deaf-blind children, a joint program was developed to provide services at home and through local agencies.

A program was developed for those deaf-blind children who were at home and for whom limited services were available due largely to their rural location. This "at home" program was conducted by the family, with the assistance of the outreach worker. When developing an at home program, parent education and interaction play a vital role in the education and development of a deaf-blind child. A well-balanced and effective program will utilize the parents in every aspect of child stimulation.

In order to conduct a successful homebound program for deaf-blind children, all essential information concerning the family dynamics and the child's birth, health, medical, and educational history must be obtained. A vehicle for obtaining this information, the initial home visit form, was developed (See attachment.). This revised form should be used as an interview guide, with the individual knowing most about the child serving as the informant. In most cases, this will be the child's natural mother. By utilizing the initial home visit form, information on parent feelings, attitudes, and expectations can be identified. Before the parents are approached, the outreach worker should have gathered all essential information concerning the child's educational, medical, and health history. This information should be shared/discussed with the parents. After the initial contact, the therapist then begins to develop a homebound program for the child to be conducted by the family.

Often the child has attended various programs and/or has been seen by numerous professionals. This information was not always available from the sources available to the outreach worker. Only the parents can offer this information or can refer one to the proper program and professional. This information is helpful to the outreach worker because it reduces or eliminates duplication of evaluational services and treatment.

After the initial meeting and development of the home program, the outreach worker must then update or eliminate diagnostic information which is no longer valid or is not current. This may include obtaining current or new audiological, ophthalmological, orthopedical, neurological, physical, psychological, or any other evaluational service which will provide the outreach worker with the necessary information for appropriate programming. The evaluational services mentioned above can either be obtained at the local level, if these professional services are available, or can be obtained at the home base, where these professionals should be available. The significance of having all the current information available on the child is that for a program to be effective, one must not further handicap the child by failing to know the child's current needs and functioning levels.

A large number of deaf-blind children are slow developers. This is especially true for children who are at home and have not had an opportunity to attend regular programs or have not had the professional involvement needed. The homebound program, used with children in the outreach program, was designed with the use of developmental scales. These scales assess the child in the areas of socialization; daily living skills; and motor, perception, and language skills. The Callier Azusa (Stillman, 1977) was the primary assessment tool used. From this information an I.E.P. can then be developed.

The team approach is recommended when developing an at home program for parents. The team should include the physical therapist, speech therapist, occupational therapist, nutritionist, neurologist, audiologist, ophthalmologist, pediatrician, and any other professional the child/parent may have contact with. In a number of situations, the outreach worker will be asked to provide expertise for which s/he has no formal training. At this point the outreach worker should use professional staff members as consultants. Any information obtained should be shared with the parents.

When advising parents of deaf-blind children, the outreach worker must be consistent so as not to confuse the parents or the child, and flexible, so that s/he is willing to make the necessary program adjustments and is prepared to adjust to any changes in the family dynamics.

The outreach program focuses on the use of local resources to provide services for deaf-blind children. Inservice training was provided to the local agencies. Agency personnel were brought to other deaf-blind facilities for training. In remote areas where virtually no support services existed, the outreach program increased home visits in order to meet needs.

Psychological Stages and Parental Needs

Many articles have been published concerning the acceptance of the handicapped child (Barsh, 1976; Gowan & Demos, 1965; Robinson & Robinson, 1976). In learning to accept the handicapped child, parents often go through a series of stages. Although not every parent will go through the exact same stages, all parents will have an initial reaction and will then move in the direction of acceptance, or in some cases, toward nonacceptance.

According to Robinson & Robinson (1976), the earliest stage parents go through in accepting the handicapped child is that they may not be aware of the seriousness of the problem. Although this initial reaction may be a defense mechanism, with certain handicaps the obviousness of the problem may not be detected or dealt with by the parents. The parents may be looking for a more socially acceptable answer. The parents' feelings might be that the child will "grow out of" its handicap. In this early stage toward acceptance, the parents may receive advice and opinions from friends and in some cases from professionals, which may serve to deny temporarily the seriousness of the problem. There are no general guidelines as to how long parents will remain in this initial stage. In some cases parents never realize the seriousness of the problem. However, in most cases, the parents do recognize it and proceed onto the next stage of acceptance.

The second stage is recognizing the handicap for what it is. The parents' reaction may be labeled as shock and disbelief. The reactions of the parents will vary as the degree and type of handicap vary. The parents will realize that the handicap is not going to go away. Once this is realized, these parents will begin to prepare themselves to seek additional help for the handicapped child.

The third stage for most parents is to search for the cause. Parents will rationalize that if you find the cause, you find the cure. Unfortunately, in some cases the cause is never identified and even when it is, there are no guarantees that surgery or medication will eliminate the handicap. Fortunately, in a number of handicaps, surgery, along with medication, has had a positive effect on the handicapped child. During this third stage, parents often come in contact with a number of professionals, educational as well as medical, which offers them an opportunity to ask questions and receive advice and guidance concerning the handicap. Additionally, the parents themselves receive counseling and advice regarding nature of the handicap and their reactions to the condition and child. The parents' attitudes and reactions toward the handicapped child can become healthier as some of the guilt and confusion are cleared by the professional. However, if the etiology is not identified, the parents may become more confused, as well as frustrated. In time, most parents accept the cause, known or unknown, and prepare themselves to proceed to the next stage toward acceptance.

In searching for a solution, the fourth stage toward acceptance, parents will often obtain the necessary evaluations to determine the needs of the child. Once again by coming in contact with a number of professionals, depending on the handicapping condition, parents gain information which allows them to understand the needs of the child and to set goals for the child. They may receive some training which will enable them to work more comfortably and effectively with the child at home. Overall, the parents begin to feel more comfortable with the handicapped child. When the child's needs are being met, a number of the parents' needs are also met. Programs that provide services for handicapped children may provide support services, such as parent groups or counseling for parents. These support services can make a difference on how the parents feel and deal with the handicapped child.

In the final stage toward acceptance, acceptance of the handicap, most parents probably do not ever accept the handicap. However, they must learn to tolerate it, and therefore, to accept the child. The parents are able to deal with many of the conflicts of raising the child with handicaps. However, this acceptance of the child may change as the needs of the child and parent changes. These changes may be a result of physical change as well as educational. Family dynamics may also change, creating adjustments within the family structure. These changes may confuse or frustrate parents, which may affect how the child is dealt with and accepted.

Professionals make numerous mistakes when dealing with parents of the handicapped child. Some professional pitfalls include: (1) not understanding parents' expectations of professionals; (2) not involving parents in the program or treatment; (3) not understanding the total family picture; (4) not dealing with cultural and language differences, including different value systems; (5) not having appropriate contingencies for parents; (6) developing a false sense of security for the parents; (7) not developing realistic short-term and long-term goals; (8) overwhelming the parents with too much information and using professional jargon, which confuses parents even more; (9) lack of appropriate demonstration; and (10) not providing or directing parents to the necessary support services.

Parents also have similar pitfalls, which may include: (1) not realizing or accepting their responsibility, (2) not ventilating problems and emotions, (3) lack of future considerations, (4) failure to carry over the program at home, (5) accepting misinformation and advice, (6) lack of planning when meeting with professionals, (7) accepting poor or inappropriate programs, (8) failure to acknowledge or see growth, (9) not participating in the child's total program, and (10) over-protectiveness.

Parental attitudes and reactions are extremely important toward the growth of the child as well as the parents. Some reactions and attitudes include shock, refusal to accept, guilt, rejection, and confusion. These, along with many other factors, should convince the professionals that parents need help. They should be a vital component of the child's total program.

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CONFIDENTIAL

Personal Identifying Information

Child's Name ____________________ Referral Source ____________

Date of Birth ____________________ Date of Interview ___________

Sex __________ Interviewer ___________________________________

Place of Birth _________________ Address _____________________

Present Family Physician _____________________________________

Handicapping Condition(s) ____________________________________

____

Etiology ____

Child Resides With: Name _____________________________________

Address ____

Family Background

Father __________________ Age ___	Mother _______________ Age ___
Occupation _______________________	Occupation ____________________
Address (home) ___________________ __________________________	Address (home) ________________ _____________________
Phone ____________________________	Phone _________________________
Address (business) _______________ __________________________	Address (business) ____________ _____________________
Phone ____________________________	Phone _________________________

Siblings

	Name	Age	Sex	Grade Level
1.				
2.				
3.				
4.				
5.				
6.				

Financial Assistance ____________________

I. Statement of Problem

A. What do you feel is your child's major problem or problems?

____

____

____

B. History of Past Services

1. Medical (general) ____________________

____

2. Dental ____________________

3. Educational ____________________

____

4. Special Services

a. Speech Therapy ____________________

b. Physical Therapy ____________________

c. Audiological ____________________

d. Ophthalmological ____________________

I. Statement of Problem (continued)

B. History of Past Services (continued)

4. Special Services (continued)

e. Orthopedical ______________________________

f. Psychological ______________________________

g. Other ______________________________

____

II. Medical History

A. Pregnancy

1. Duration ______________________________

2. Complications ______________________________

____

3. Medications ______________________________

____

4. General Health ______________________________

____

5. Other Factors ______________________________

____

B. Medical diagnosis of the child at birth ______________

____

III. Present Parent Observation of Developmental Behavior

A. Socialization (interaction with other people and his environment)

____

____

III. Present Parent Observation of Developmental Behavior (continued)

B. Daily Living Skills (feeding, dressing) ____________________

____

____

C. Motor ____

____

____

D. Vision ____

____

____

E. Hearing ____

____

____

F. Language ____

____

____

IV. Parent Goals for the Child in the Near Future (immediate and long-range)

____

____

____

____

A. Efforts being channeled in this direction ________________

____

____

____

V. Comments

A. Happiest ______________________________

B. Unhappiest ______________________________

C. Frustrated ______________________________

D. Attentive ______________________________

E. Excited ______________________________

F. Child's Favorite

1. Color ______________________________

2. Toy ______________________________

3. Time of Day ______________________________

4. Foods ______________________________

5. Activity ______________________________

6. Reinforcement ______________________________

VI. Expectations of Home Visitor by Parents ______________________________

____

____

____

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Revised
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11/75

THE DESIGN OF INSTRUCTIONAL PROGRAMS FOR SEVERELY MULTIHANDICAPPED STUDENTS

Jan Writer

This paper will provide educators (teachers, aides, and support personnel) who work with severely and/or profoundly multihandicapped (SPMH) children and youth an overview of basic considerations for developing appropriate instructional programs for their students. Emphasis is placed on the individuality of each SPMH child and the importance of developing the child's level of functioning through the use of those techniques and materials which are most relevant. Information will be discussed within the following format (Williams, Brown, and Certo, 1975):

1. What skill do you want the student to perform?
2. Why do you want a student to perform a specific skill?
3. How do you intend to teach the student to perform the skill?
4. How can you verify that the skill is being or has been taught?
5. What instructional materials need to be used for the skill to be acquired and performed?
6. Can the student perform the skill across persons, places, instructional materials, and language cues?
7. Can the student perform the skill without directions from persons in authority?

What to Teach

What skills are meaningful for the SPMH child to acquire? What aspects of the child's behavior will serve as an indication of progress toward skill acquisition and/or final goal achievement?

In order to answer these questions about a given SPMH child or youth, the educator must first pinpoint skills to be taught within a curriculum area; next, divide those skills into component parts; and finally, sequence the skills from easy to hard. The delineation of specific skills to be taught will vary somewhat for each SPMH child and youth in every educational setting. Each student is an individual, quite different from the rest. Among students, the nature and intensity of the handicapping condition may vary greatly. In addition, other factors such as home environment, past experience, level of motivation, and general health will influence each child's behavior and, hence, the level of performance and his/her individuality.

SPMH children and youth are people with individual wants, needs, and abilities; individual patterns of learning; individual life styles. Because of this, educational programming for this population is not only a matter of "*different strokes for different folks*," but it also entails recognizing the fact that what works for a given child today may or may not work for that same child tomorrow. In order to address the individual educational needs of the SPMH population, it is imperative that educators direct their efforts toward the design of relevant educational programs *for each child* rather than try to fit the child into established educational programs.

Individualized instruction, appropriately applied, does not mean that the child moves at his/her own rate with the same, identical program as all of the other children in his/her class or school. It means that *individual* programs are being designed to meet the *individual* needs of *individual* SPMH children and youth. In effect, the child is *his/her own* curriculum, while the educators who work with the child serve as the facilitators of the learning process. It is the educator's responsibility to structure the environment so that appropriate learning processes can take place.

Recognition of SPMH children and youth as individuals requires that educators take strides to move beyond the need for cookbook curriculums and educational panaceas--the constant search for *the* way, the *only* way, the *best* way for educating the severely multihandicapped population. A commercially packaged curriculum which effectively meets the individual needs of each and every SPMH child and youth has yet to be (and in all probability will never be) devised. Packaged curriculums, when applied to the SPMH population, are nice warm Linus blankets for educators, but they have quite often proven ineffective in meeting individual needs of individual children and youth. That is not to say that all such curriculums are inherently bad; it is the way they are applied that is often bad. A *variety* of curriculums on hand can prove to be a valuable resource to the educator in the development of educational programs for the SPMH, but no *single* curriculum should ever become the *total* program for an individual child or youth.

The individual educational program for a SPMH child should evolve as the result of team planning on the part of significant others in the child's life--parents, teachers, teacher aides, therapists, and attendants. Decisions as to what specific skills are to be taught should be based upon:

1. What is the child's current level of functioning?
2. What can be predicted about the child's future level of functioning and/or program placement?
3. What skills must be taught so the child can progress from where s/he is now to where s/he needs to be?

Although such decisions are extremely difficult to make, one should remember that: (1) program planning is a team process; (2) program decisions can (and should) be changed, modified, and/or dropped as additional information becomes known about the child--his/her wants, needs, interests, and potential for alternative program placement.

Why Teach

Education of the severely multihandicapped needs to be viewed as a continuum beyond academics. Not every SPMH child must begin training with colors, numbers, and word cards, any more than that same child must begin training with form boards, stacking rings, and shape sorting boxes. Begin training where the child is and where s/he needs to be.

The educator should develop a readiness in the child for alternative educational programs:

1. Vocational training.
2. Academics (which may include concepts of time and money and recognition of warning signs).
3. Semi-independent living.
4. Independent functioning in the environment where the child resides (home, dorm).

It is imperative that all individuals who work with the SPMH population be constantly aware of the goal of each activity in which they engage a given child and the skills that will be acquired through participation.

Situations should be offered SPMH children which will enhance their movement from a level of dependent functioning to a level of greater independent functioning--in their home, their classroom, and in the community in which they reside. It would follow, then, that there are two primary reasons for teaching any skill to a severely multihandicapped child or youth:

1. The acquisition of the skill will serve to make the child more independent now.
2. The acquisition of the skill is a prerequisite for the development of an additional skill which will serve to make the child more independent at a later time.

So that a given child can achieve greater independent functioning, all goals written for the child should be relevant to that child--relevant to his/her life, relevant to the environment, relevant to his/her future. Skills developed should be functional skills, for which there is repeated opportunity during the day for the child to spontaneously apply them in the environments where s/he lives, works, and plays. Unfortunately, over the years, SPMH children and youth have become the best form board fitters, disk stackers, bead stringers, and puzzle placers of any population in formal education systems today. This is not unusual in view of the lack of functional curricular guidelines and the observed ability of SPMH individuals to rote memorize programs, or series of programs, even though those programs hold no intrinsic meaning or value for them.

It is no longer sufficient for a child to simply (or with great difficulty) acquire a skill; s/he must be able to functionally apply that skill. Activities should be relevant to the child in the context of his/her environment. The child may be able to acquire the skill of color-sorting inch cubes into plastic margarine tubs, but how relevant is this activity to his/her life? If the child is to learn to discriminate between colors, perhaps the use of socks, shirts, toys, cups, bedspreads, or other items found in the environment would be far more meaningful.

How Do You Teach

The procedures, techniques, and strategies that educators use to teach new skills to children are referred to as the how of instruction. These procedures may be different for each child and for each teacher. Two primary means that educators might use in order to select appropriate training strategies and to promote the development of functioning skills are:

1. The application of informal, ongoing observational procedures.
2. The development of relevant daily routine.

Informal Observations

Systematic, informal, ongoing observations enable educators to design and modify individual educational strategies for individual SPMH students so that each student is afforded the best possible chance to acquire each new skill being taught. As in any observation and/or assessment procedure, it is imperative that the educator observe, record, and evaluate what the child can do. It is the positive, observable behaviors--the "can do's"--that are the most reliable indicators of the SPMH child's current functioning level and preferred patterns of behavior. If attention is concentrated primarily on the negative behaviors observed, a masking may result whereby the teacher is so busy watching what's wrong, s/he doesn't see what's right (Gold, 1977). Areas of informal assessment which may serve to provide the educator with information applicable to the individualization of strategies, techniques, methodologies, and enviornmental designs to be used with specific students include (Writer, 1975):

1. Find out where the child is functioning (Hammer, 1974):

   (a) physically (areas of perception and motor development, level of maturation, nutrition);
   (b) socially (ability to understand and relate to the world, patterns of play--isolated, parallel, interactive);
   (c) emotionally (ability to perceive self as unique and separate from others; ability to express feelings, wants, and needs and to receive the emotional signals of others: ability to cope with life situations);
   (d) mentally (ability to problem solve, evaluate, and learn by trial and error; memory; ability to put together past information in order to generate new activity).

2. Observe how the child spontaneously interacts with the environment. Record behaviors which the child demonstrates without adult supervision:

   (a) in the home or dorm before or after school;
   (b) in the classroom;
   (c) on the playground; and
   (d) in the community.

   Determine the child's preferred avenue(s) for taking in information (mode--vision, hearing, touch, etc.; method--turning head to side to look; smelling before exploring tactually, etc.). Consider the effects of all outside stimuli on the child.

3. Identify the child's best functioning space. Where does s/he prefer to be? On the floor? In a chair? If a child spontaneously seeks out small, defined areas along the periphery of a room, the child's immediate learning will not be facilitated by demanding that s/he work in large, open spaces.

4. Ascertain the child's attention span. Determine the average length of time the child will attend to an object or activity of choice (unstructured); then determine the average length of time s/he will attend to an object or activity chosen by an instructor (structured). Planned activities might be structured in length so that their duration falls somewhere around the mean of these two averages.

5. Determine the child's reward system. Reinforcers should be selected on the basis of what the individual child thinks is good, not what the educators decide is good. Make alternatives available to the child. Give preference to those reinforcers which naturally occur within the environment (e.g., light, air, sound, touch).

   Hopefully educators have moved beyond the point of feeling that if only a program had enough M&M's it could motivate children to change their behavior. M&M's are not a panacea. Movement, vibration, and even social praise have proven to be much stronger reinforcers for this population. Many children do not like sweets and, even if they do, their nutrition should take a much higher precedence over their taste.

Development of a Daily Routine

The SPMH child has a need for structure. S/he functions best when dealing with the concrete, rather than with the abstract. A relevant daily routine helps to provide this structure, as it helps to give children a sense of security and assists them in developing concepts of time, order, and place. By following a consistent daily routine, the child can learn to anticipate activities and events; hence, things become less scary and more organized, which facilitates learning.

The time of day during which an activity occurs should also be relevant to the child. In order to be meaningful, symbols need to be taught to the child in a situation in which s/he is involved in the total event. Events should take place at a time which would correspond to the child's regular home routine. Dressing skills should be taught in the morning before class, in conjunction with toileting, when removing clothes for tactile stimulation, etc. Feeding would be taught at lunch and snack time, appropriate play would be taught during recess or free play, learning to set a table would occur prior to serving lunch family style. Consideration should always be given to the ease by which the activities planned for the child at school can be carried over and internalized in the home or in the dormitory.

If the child is to internalize an activity, s/he must first be allowed time and opportunity during the day for:

1. Task generalization to other situations.
2. Spontaneity of application of skills learned.

Verifying What Has Been Taught

The advent of Public Law 94-142 has served to remind educators that they are accountable for all educational programs designed and implemented with SPMH children and youth. This accountability includes being able to identify long-term goals and short-term objectives for each child as well as being able to delineate any progress toward goal achievement. Verification of such progress may best be achieved through (a) classroom documentation and (b) individual child assessment.

Classroom Documentation

Over the years, classroom documentation tools have been scorned, castigated, and frequently neglected by educators of SPMH children and youth. Words frequently used to describe documentation tools include: "too time consuming"; "too complex"; "a waste of time"; "not relevant to my situation (i.e., I can remember everything that happens during the day, and then write it down at 3:00....)." There are even some good-intentioned individuals who may design a documentation tool, record a little data on it, and then relegate it to a clipboard where it gathers dust and fingerpaint prior to its being filed away and forgotten.

Besides lending accountability and credibility to a program, classroom documentation of individual child behavior can:

1. Help keep the teacher oriented in the direction of long-term goal achievement.
2. Inform a teacher when a goal is achieved and, if it is achieved, it can provide valuable information on the learning patterns that the child demonstrated in getting there.
3. Save the teacher time in the writing of lesson plans--a well-designed documentation tool, with subsequent behavioral objective(s) may bridge a time span of several weeks.
4. Provide an objective communication link between home programming and classroom programming.

A classroom documentation tool should be just that--a tool that the educator can use to document pupil behavior. It need not be so complex that educator and parent alike experience difficulty and frustration in its use. A good documentation tool (see Appendix A):

1. Can be used, even with a child "under arm."
2. Can be interpreted at a glance by all who are required to use it (or make sense out of it).
3. Provides clear, concise, objective data.
4. Facilitates relevant educational planning.

5. Is versatile--it can be applied to many different situations in the recording of varying types of behavior.
6. Works for, rather than against, the teacher.

Individual Child Assessment

As those who have worked with severely multihandicapped children and/or youth are well aware, accurate assessment of this population can rarely, if ever, be achieved through a short-term, one-setting evaluation. The SPMH individual must be assessed over time in all settings in which s/he is expected to perform, primarily by persons who have had the opportunity to observe the child on an ongoing basis.

Severely multihandicapped children should first be observed in a situation which is familiar to them where they already feel comfortable performing (e.g., in the home, in the dorm, in a familiar classroom). This will better afford the observer an opportunity to assess the child's existing spontaneous, adaptive behaviors. The evaluation of the severely multihandicapped student solely in novel environments with unfamiliar adults will tend to produce a confounding effect on those behaviors observed and will cloud the child's true level(s) of performance.

Accurate assessment of the SPMH population is highly contingent upon the individual formal and informal tools selected for usage. Appropriate procedural selection should be primarily based upon both the functioning level(s) of the SPMH individual being assessed and the expertise of the individual doing the assessing. Within any given educational program, a variety of assessment procedures and/or tools may be effectively applied. A classroom program may elect to use one procedure with all of its students in order to demonstrate overall program effectiveness and then supplement this with additional procedures in order to better assess individual needs.

Regardless of the assessment system a program decides to use, flexibility should prevail, if the concerns presented by changing populations are going to be addressed. A procedure should not be used with any severely multihandicapped population only because it has proven effective with other severely multihandicapped populations in the past (recognizing the fact that no two severely multihandicapped populations are the same). Likewise, an assessment tool should not be applied with any given severely multihandicapped child or youth only because it has proven able to delineate the functioning level(s) of other severely multihandicapped children and youth. There are many considerations which should play a role in the selection of assessment procedures/tools appropriate for individual groups of severely multihandicapped. Among these are (Writer, 1977):

1. Read the instruction manual which accompanies the tool. Identify the population on which it was originally tested. You are not looking for a perfect population match, but if a tool was tested on EMR children with no known sensory or motor deficits and you are currently working with deaf-blind, nonambulatory children, you may want to select a different tool.

2. Determine whether the application of a given tool will actually provide the information that is needed in order to design relevant educational programs for the individual children you serve. If a tool does not delineate progress (or lack of it) in areas pertinent to the child in the context of the environment in which he or she is (or will be) expected to perform, choose a different tool.

3. Be aware of test items which purport to be looking at one area of development, when in fact they are looking at several. "The child will point to pictures of five familiar objects on command," may be cited as a receptive language item, but a wise educator would quickly realize that a child would also need fairly sophisticated fine motor (point), gross motor (reach), and vision (identify picture) skills in order to perform correctly. Common sense, combined with appropriate consultation, should allow for the modification or elimination of items inappropriate for your population.

4. Select tools which compare children to themselves, rather than to an established norm. There is no norm within the severely mutlihandicapped population.

5. Give preference to tools which assess the child's spontaneous behavior in both home and school environments, as opposed to those which primarily measure conditioned behavior at table tasks.

6. Remember, far too often it is not a given tool that is bad, but the way it is applied that is bad.

What Materials to Use

Even the most relevant, well thought-out programs for SPMH individuals can lose their effectiveness as a result of inadequate and/or inappropriate instructional materials. Adherence to a few basic guidelines and awareness of some general considerations for materials selection may save both the educator and the child valuable time and expense.

Basic Guidelines

1. Know the children that you will be instructing before purchasing any instructional materials (see each child: visit the home, dorm, or prior educational placement).
2. Avoid purchasing any materials that can be made (by yourself, parent groups, volunteers, or the local boy scout troup) or donated (by benefactors or local merchants).
3. Make sure that all materials purchased (or made) are both safe and durable.
4. Remember that every object placed in a child's hands should be placed there for a specific purpose individual to that child.

General Considerations

When selecting instructional materials for SPMH children and youth, priority should be given to items that:

1. Emphasize functional skills development (select real-life materials over artificial ones).
2. Provide multisensory cues (as deemed appropriate for specific programs).
3. Are novel or offer results that are not always predictable.
4. Are matched to individual child functioning levels (not too easy; not too hard).
5. Manifest cause-and-effect relationships.
6. Encourage active engagement on the part of the child.

Can The Student Apply The Skill in Novel Situations

Once the student has proven able to demonstrate performance of a skill in routine and/or structured situations, it is imperative that the child be given opportunities to perform the skill across a variety of persons, places, instructional materials, and language cues. Educational programs should progress from (initial) consistent presentation of stimuli to more varied presentations (i.e., they should begin with the very concrete and then move toward the abstract).

Can the Student Perform the Skill without Direction

The SPMH child or youth's attainment of independence at a given task is reflected in his/her ability to execute that task spontaneously and independently without adult direction. To be truly independent in the performance of the acquired skill, the student must be able to demonstrate the skill under the condition(s) where it will ultimately be expected to occur (i.e., beyond the classroom program).

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APPENDIX A

EXAMPLES OF CLASSROOM DOCUMENTATION TOOLS

****

Child: ____________________ Week of: ____________________

Teacher: ____________________

KEY

[+] = spontaneous correct response
[-] = incorrect response
[P] = prompted correct response

____

Objective	Monday	Tuesday	Wednesday	Thursday	Friday	Comments

*** Designed by: JANIS CARTER

****

Child: Laurie Alexander

Week of: January 10-14, 1977

Teacher: David Price

KEY

[+] = spontaneous correct response
[-] = incorrect response
[P] = prompted correct response
, physical

Objective	Monday	Tuesday	Wednesday	Thursday	Friday	Comments
1. L. will independently hang up her coat in her coat "cubby," upon entering the classroom in the morning.	–	P	P	*didn't wear coat to school	P	
2. L. will independently pull her (outer and under) pants down from her waist to her knees, prior to sitting down on the toilet.	9:30 – 11:00 – 11:45 P 1:30 –	9:30 P 11:15 P 12:00 – 1:45 P	9:30 P 11:00 P 12:00 P 1:45 P	9:20 P 11:15 P 11:45 + 1:30 P	9:30 P 11:15 + 12:00 + 1:45 P	
3. L. will sort the utensils used by self and classmates at lunch (5@: fork; spoon), immediately prior to lunch.*	fork: P–P++ spoon: –P+–P	fork: P++–+ spoon: –P++P	fork: P++P+ spoon: ++P+P	fork: +P+++ spoon: P++P+	fork: +++P+ spoon: ++P++	*sorting fro box of utensils on lunch table
4. When presented with a box of colored socks (5@: red, blue, yellow), L. will remove the socks from the box and sort them into 3 piles (color sort).*	R: P–P++ Y: P++P+ B: ++P++	R: –P+P+ Y: ++–++ B: +P+–+	R: P++++ Y: +P–PP B: P++PP	R: +P+P+ Y: P++–+ B: ++P++	R: +++P+ Y: +P–++ B: +++P+	*sorts on counter nex to clothes dryer.
5. L. will spontaneously give the sign for "toothbrush" prior to brushing her teeth (immediately following lunch).	P	P	P	+	P	
6. L. will independently walk from the classroom to the school's front door (to wait for bus), at the end of the school day (2:30 p.m.).	P	+	+ *	P	+	*spontaneously gave sign for "bus," when reached front door

**** Designed by: JANIS CARTER

KEY

☺ = drinks from glass without spilling
😟 = drinks from glass but spills some juice on table/floor
☹ = misses mouth altogether

Child: ______________________

Teacher: ______________________

Objective: ____

Day	Date	Breakfast	Snack	Lunch	Snack	Dinner	Comments

***Designed by: Laurie Dushkin

Child: Suzi Dale

Teacher: Bob Jones

KEY

🙂 = drinks from glass without spilling
😕 = drinks from glass but spills some juice on table/floor
🙁 = misses mouth altogether

Objective: Suzi will independently drink liquid (orange juice for breakfast and snack; milk for lunch and dinner), from a 6 oz. glass at appropriate times within the daily routine. (parent documents breakfast and dinner; teacher documents snack(s) and lunch).

Day	Date	Breakfast	Snack	Lunch	Snack	Dinner	Comments
Tue	2/8/77	🙁	🙁	😕		🙁	No afternoon snack offered
Wed.	2/9	😕	🙁	🙁	😕	😕	
Thur.	2/10	🙁	🙁	*	😕	😕	* physically refused to eat.
fri.	2/11	🙁	🙁	🙁	😕	🙂	
Sun	2/13	😕	🙁	😕	🙂	🙂	Forgot to document 2/12
Mon	2/14	😕	😕	😕	🙂	😕	
Tue.	2/15	🙂	😕	😕	🙂	🙂	
Wed	2/16	😕	—ABSENT—			😕	Out sick; has cold!
Thurs.	2/17	😕	—ABSENT—			🙂	Still out sick
Fri.	2/18	🙂	😕	😕	🙂	🙂	
Sat	2/19	😕	😕	🙂	🙂	🙂	
Sun.	2/20	🙂	🙂	🙂	🙂	🙂	Happy day!

**** Designed by: LAURIE DUSHKIN

Child: ______________________ **Teacher:** ____________________

Objective: ____
____
____
____

KEY

☺ = independent success

😶 = success with prompt(

____

☹ = incorrect response/ no response

Dates	Monday	Tuesday	Wednesday	Thursday	Friday	Time Completed

Comments: ____
____

Designed by: MARILYNNE ESTAVILLO

****

Child: Steve Simmons **Teacher:** John Evans

Objective: Upon the verbal/sign cue "shoe off," Steve will independently take his shoes off, prior to: 1)jumping on the trampoline at 10:30am; 2) 12:15pm nap time (before laying down on his cot).**

KEY

☺ = independent success

😐 = success with prompt(
physical

☹ = incorrect response/
no response

Dates	Monday	Tuesday	Wednesday	Thursday	Friday	Time Completed
Jan. 3-7, 1977	1) 😐 9min. 2) ☹ 14min.	1) 😐 10min. 2) ☹ 9min.	1) ☹ 12min. 2) ☹ 7min.	1) ☹ 8min. 2) 😐 8min.	1) 😐 7min. 2) ☹ 9min.	*See individual days for completion times.
Jan. 10-14, 1977	1) 😐 9min. 2) ☹ 11min.	1) ☹ 11min. 2) ☹ 8min.	1) 😐 7min. 2) 😐 8min.	1) 😐 6min. 2) 😐 9min.	1) ☺ 7min. 2) 😐 6min.	
Jan. 17-21 1977	1) 😐 8min. 2) 😐 6min.	1) 😐 7min 2) 😐 5min.	1) ☺ 7min. 2) ☹ 9min	1) ☺ 6min. 2) 😐 7min.	1) 😐 6min. 2) ☺ 7min.	
Jan. 24-28, 1977	1) 😐 6min. 2) 😐 5min.	1) ☺ 6min. 2) ☺ 7min.	1) ☺ 5min. 2) ☺ 5min.	1) ☺ 6min. 2) ☺ 5min.	1) ☺ 4min. 2) 😐 3min.	
Jan. 31-Feb. 4, 1977	1) ☺ 5min. 2) ☺ 4min.	1) ☺ 4min. 2) ☺ 5min.	1) ☺ 2min. 2) ☺ 3min.	1) ☺ 3min. 2) ☺ 3min.	1) ☺ 2min. 2) ☺ 3min.	*Comment: Feb 2-4 ← S. removed his shoes spontaneously w/out verbal/sign cue

Comments: ** Steve will take his shoes off, within 5 minutes from being given the cue "shoe off."

During a (1/28) parent conference, Mrs. Simmons commented that she felt that this kind of documentation would be easy to do at home, & that she would like to chart "shoe off," when Steve is undressing for bed. (documentation to begin 1/31/77).

**** Designed by: MARILYNNE ESTAVILLO

Name: ______________________

Teacher: ______________________

[+] = correct response
[-] = incorrect response
[p1] = verbal prompt
[p2] = gestural prompt
[p3] = physical prompt

Objective: ______________________

____

____

Special Instructions: ______________________

____

Date	Day	Time				Completion Time	Comments

*** Designed by: ALISON RYAN

****

[illegible]: Greg Larson

Teacher: Brenda Farmington

KEY

[+] = correct response
[-] = incorrect response
[p^1] = verbal prompt
[p^2] = gestural prompt
[p^3] = physical prompt

Objective: Greg will set the table for lunch. In front of each of the 5 seats he will place (in the following order): 1) a cup; 2) a napkin; 3) a cookie (on the napkin). Greg will complete the activity within 10 minutes.

Special Instructions: All materials are to be stacked in the middle of the table, prior to initiation of task.

Date	Day	Time	cup	napkin	cookie	Completion Time	Comments
2/7/77	Mon.	1:15pm	$p^{13}p^{13}p^3p^3$[-]	$p^3p^3p^3p^3p^3$	$p^3p^3p^3p^3p^3$	17 min.	
2/8/77	Tue.	1:15pm	$p^3p^{13}p^{13}p^{13}$[+]	$p^{13}p^{13}$[+]p^{13}[-]	p^{13}[+]p^{13}[-]p^{13}	18 min.	
2/9/77	Wed.	1:00	p^{12}[+][+]$p^{12}p^{12}$	$p^{12}p^{12}$[+]p^{12}[+]	p^{12}[-]$p^{13}p^{12}p^{12}$	16 min.	
2/10/77	Thur.	1:20	p^{12}[+][+]p^{12}[+]	p^{12}[+]p^{12}[+][+]	$p^{12}p^{12}$[+]$p^{12}p^{12}$	15 min.	Cried throughout activity
2/11/77	Fri.						Absent
2/14/77	Mon.						Absent
2/15/77	Tue.	1:15	$p^{12}p^{12}p^{13}$[+]p^{12}	$p^{12}p^{12}$[-]$p^{13}p^{12}$	$p^{12}p^{12}$[+][+]p^{12}	17 min.	
2/16/77	Wed.	1:15	p^{12}[+][+]p^{12}[+]	[+][+][+]$p^{12}p^{12}$	p^{12}[+]p^{12}[+][+]	14 min.	
2/17/77	Thur.	1:00	p^{12}[+][+][+][+]	[+][+][+]p^{12}[+]	[+][+]p^{12}[+][+]	14 min.	
2/18/77	Fri.	1:15	[+][+]p^1[-]p^{12}	p^{12}[+][+]p^1[-]	p^{12}[+][+][-][+]	15 min.	
2/21/77	Mon.	1:12	[+][+][+][+]p^{12}	[+]p^1[-]p^{12}[+]	[+][+][+][+][+]	13 min.	Clapped for self at end of activity
2/22/77	Tue.	1:15	[+][+]p^{12}[+][+]	[+]p^{12}[+][+][+]	[+][+][+][+][+]	12 min.	" "

**** Designed by: ALISON RYAN

Child: ______________________ Dates Covered: ______________

Teacher: ______________________ Key: put a check (✓) in the appropriate column and initial. Record the time.

Activity: ______________________

Objective: ______________________

____

____

Day	Date	No Response	Success with Prompt	Spontaneous Success	Completion Time

Comments/Subsequent Behaviors Noted: ______________________

____

____

Designed by: VICKI WEIGEL

Child: Sammy Smith

Dates Covered: March 7-18, 1977

Teacher: Gretchen Brown

Key: put a check ( ) in the appropriate column and initial. Record the time.

Activity: Independent making of bed

Objective: Sammy will independently make his bed every morning, before leaving home for school. Fifteen minutes will be allowed for task completion (start to finish).

Day	Date	No Response	Success with Prompt	Spontaneous Success	Completion Time
Mon.	3/7		✓ verbal & physical		22 minutes
Tues.	3/8		✓ verbal & physical		25 minutes
Wed.	3/9		✓ verbal		18 minutes
Thurs.	3/10		verbal & gestural		20 minutes
Fri.	3/11			✓	16 minutes
Mon.	3/14		✓ verbal		21 minutes
Tues.	3/15			✓	19 minutes
Wed.	3/16			✓	16 minutes
Thurs.	3/17		✓ verbal		14 minutes
Fri.	3/18			✓	16 minutes

Comments/Subsequent Behaviors Noted: Mrs. Smith, Sammy's mother, does the daily documentation. Although Sammy makes his bed on Saturday and Sunday, Mrs. Smith is not required to document, as these are the family's "fun days." (Even parents need some time off.)

Designed by: VICKI WEIGEL

ASSESSMENT AND REMEDIATION OF MULTIHANDICAPPED CHILDREN

Mary Lovey Wood

I will begin by using a model of learning so we can have a common vocabulary as a basis for our discussion. The model is based on a psycholinguistic model adapted from Osgood by Kirk and Kirk. When we work with multihandicapped children, we notice all the different avenues of learning that don't work. With a normal child everything works, everything fits together, and the child learns; thus, we don't notice how he or she learns what he or she learns. We do notice children who are not learning. We can't teach them through vision, we can't teach them through touch, we can't teach them through hearing; how are we going to teach them? That's our problem for the morning.

We used to think that there were just two major channels of learning: seeing and hearing. The more we work with multihandicapped children, the more we find that the tactile pathway is a very important avenue of learning.

On the output side of our model we have expression, such as motor expression, writing, signing, gesturing, or very low-level head-eye movements, imitating gestures, reflexes and motor movements. We also have speech output, which is the end product of language and learning. When a child doesn't talk, we don't begin by teaching him or her to say a word, because that is the end product. Before the child can say anything, do anything or write anything, he or she must have the means to organize what he or she wants to say or do. Otherwise s/he would have random or meaningless gestures and speech.

For the sake of example, let's say that a child sees and hears. What has to happen? This information s/he hears or sees has to hook up with something, to mean something. So as soon as the child receives the stimulus, s/he has to understand or comprehend it, and this is represented by the comprehension side of our model.

In between comprehension and expression something else goes on besides simply understanding the names of things or using names of actions. Call it reasoning, associating, integrating, whatever means something to you. This is represented by the association section of the model.

As an example of understanding what you hear, suppose I said, "Show me your pencils." All you'd have to do to perform correctly is understand those four words, "show me your pencils". But what if I said, "show me what you write with?" You have to do something beyond simple word comprehension. You have to relate the words to past experience of writing instruments and the words for that experience. We call this connection between words and experiences verbal reasoning or associating. We also reason with what we see. On intelligence tests, for example, visual reasoning is measured by things like block design, mazes, puzzles. If you place chess, then you have some understanding of visual comprehension and visual reasoning. We can also consider tactile integration or tactile reasoning. If you touch something once, you know what it's going to feel like the next time you touch it.

These important aspects of learning are symbolic, or indicative of a meaningful level of learning. There also is a nonmeaningful, or automatic aspect of learning that's very important to communication, such as memory. You don't have to understand to remember. You don't have to think to remember. For example, if I said to you, "Say 37912." Did you have to understand it? No. You only remembered a series of sounds. I could have said la-be-da-be-do-ba and you could repeat it, but you don't have to understand it. We see children who have good automatic skills such as memory and imitation. They can go through lots of motion and perform without meaning. Normal children don't do that beyond a very primitive level. If they say something, it's very likely that they understand what it means. We see children who have beautiful imitation of speech; you ask them their name and they say it, perfectly articulated. We see children who imitate sign language but do it without meaning. This is a serious form of a language disability which often goes undiagnosed.

Sharon, for example, is the best dancer at the deaf-blind school. All she has to do is see someone dance and she can perform every step, because she's a perfect mimic. In spite of this special skill, very little of what she does has communicative intent. We also see children who have good meaningful skills, good cognitive functioning, but very poor automatic skills of memory and sequencing. Sequencing involves everything from putting sentences in the right order when you're relating an event, to putting words in the right order in a sentence, to putting sounds in the right order in a word. When you have a child who looks at a picture and says, "lawn man mower the grass cut," you know what the picture is about and you know what the man's doing in the picture, but the child has little grasp of the structural rules necessary to organize his or her utterance.

Some children say "pots" for "stop" and "tea" for "eat." If a child has some sequencing problems, they may occur in signing, writing or in other avenues of communication.

Another nonmeaningful aspect of learning is closure, when you have to fill in the blank where something's missing, visually or auditorially. For example, some children's books provide activities where the child has to find all the cats in the tree by only seeing a tail here or an ear there. Some children can't copy off the board if they can't see every little stroke of every little letter that's written.

It's very rare that a child in the classroom hears everything a teacher says. The teacher may say, "go get a ..ink of wa..er and then come back to your desk." A child may not have heard each sound but can fill in the message. A child with closure problems won't be able to fill in the gap and figure out the message because he or she doesn't have enough understanding of linguistic forms to know what the linguistic possibilities might be. If a child can't close on auditory information, whether he or she has a hearing loss or not, the child will have trouble. If he or she has a hearing loss as well, he or she is in big trouble.

The nonmeaningful aspects of speech also include grammar and articulation. No one ever taught a four-year-old child how to conjugate a verb, but a normal four-year-old child makes very few mistakes in grammar or in sentence construction. They don't talk like telegrams, and the ones who do talk like telegrams, who say "me go daddy now, bye bye," are the children who arrive at school with oral language skills which are inadequate for the learning of written language.

Children who have automatic levels of problems in grammar, memory, sequencing, or closing are high risk for written language problems. Children who have visual motor problems are high risk for mathematical problems. Some children have learning problems that aren't identified until the second or third grade. What can we predict about them from seeing them at preacademic stages of development?

Many children who do not read and spell never learned to use these channels of learning together. These channels have to work together and complement each other. We need to know that when we're teaching children who don't learn normally. We need to look at the visual channel, the auditory channel and the tactile channel. We must find the strengths and teach the weaknesses through the strengths, trying to help the child integrate these channels and processes.

When there is one problem there is high risk for another. Don't quit looking if you identify a problem, diagnose it, and start working on it. Be very sure that there are no other learning disabilities or sensory impairments that you've not identified and attended to by treatment or referral. If you find a child has a hearing loss, look hard for additional, perhaps unrelated, language disorders. You know a rubella child will have many problems, not just sensory impairment. We're talking about children who, even when sound is loud enough for them to hear it, still cannot attach meaning to the sound. We see hearing-impaired children who have unrelated language disorders. We see retarded children who also have low verbal skills, representing unrelated language disability. We see very smart children functioning two years above age level in all motor-visual tasks and just barely functioning on auditory-vocal tasks. People can have measles and mumps at the same time; so can the same child have two or three unrelated disorders at the same time.

When we evaluate a child, we compare him or her to other children through the use of normative data and analyze his or her functioning in various areas for differential evaluation within the child. We determine how well s/he understands what s/he hears; understands what s/he sees; reasons with what s/he sees; how well s/he speaks, gestures, copies, draws, or pantomimes; how good his or her visual and auditory memories are. We must use all devices to evaluate the child, including developmental scales, formal psychological testing, and language inventories. We must describe what the child is doing, compare him or her to other children, and compare the child to him or herself.

Don't accept an average on any kind of test score, unless you know what the breakdowns are by subtests and the differences between verbal and nonverbal scores and between automatic and symbolic functioning. Averaging of scores masks strengths and weaknesses and provides no way to plan a remediation program. Individual analysis of the various channels and processes does.

An additional factor to consider in evaluation is children who are bilingual or bidialectical. We must test children in their own language or dialect. If I test a child who speaks English as a second language and I give a test in English, I still do not know how to describe his or her pathology. I'd have to give the test in the native language or dialect before I could tell how he or she is functioning.

A child who speaks his or her dialect well is not displaying a pathology. The indication is that he or she learns well.

My bias as a speech pathologist has led me to insist that we ought to try to teach every nonverbal child to talk. That's wonderful if it works. We can allow a child to function in the hearing world if s/he talks or speech-reads and that is ideal. But what if s/he can't learn to talk? What if s/he's been at home until age 8, has a moderate-to-severe hearing loss, some visual impairment, doesn't talk, has a few basic primitive gestures, and never has been in any educational program? I think the only appropriate approach is to find any means to help him or her communicate. It's important to get information into him or her, to teach him or her how to control the environment in some way besides throwing a fit. So I would say anything goes: tactile input, finger spelling, understanding signs or speech if possible.

Let me talk about remediation to those of you who are saying, "O.K. Now we've identified all the strengths and weaknesses of these little children. What the devil do we do with them?"

There is no rule, recipe or guideline for multihandicapped children. There is no right way. You must do what works. You must use anything you can find, any pre-package teaching plan, or anything else to help teach this child. One basic thing to remember is the importance of a symbol system to this child so he or she has a means to communicate. You know we have school readiness; we also have symbol-system-learning readiness. One of the most frustrating things in trying to set up a level for learning a symbol system is there is so much repetition with minimal returns, systematic presentations perhaps as many as 200 times, for the many things you want to teach. If you teach a child in less than 1,000 exposures, you're doing a good job or you've got a very receptive student. A normal child probably hears a word 200 times before s/he learns it, so a multihandicapped child would take 5 or 6 times the exposure of a normal child.

Some guidelines for working with multihandicapped children are:

1. The first priority is meaning: a one-to-one correspondence between a sign and an object, a word and an object, a sign and an action, a word and an action. Don't worry about how children say it, because what if you teach them a word, say "this is a table, table, table ", and they learn the symbol "table" and they make the sign but say it poorly. You say "no, no, no , not this way, that way." You've taught them that it's not a table after all. And you just spent 1,000 times trying

to teach them that it *is*. Don't correct the way they say it or sign it until you are sure they understand the meaning of the word.

2. Whatever symbol system you work on has to be applied to something that's functional for the child. It won't do any good to teach *bird*, *sky* or *airplane* until s/he has learned *potty and milk.* Communication must be useful. The most meaningful thing to any of us is our body, and this is especially true for a child who's very contained in him or herself and can't get out to the environment because s/he can't see it and/or hear it very well. Whenever you want to have anything mean something to them, relate it to themselves, their actions, their body part, and their daily lives.

3. We must impose ourselves on our pupils to force responses. This can mean that we must put them through the motion that's appropriate. If you want a child to drop a bead in a bucket when s/he hears a sound, put him or her through the motion. For example, *a big sound*, *take his or her hand with the bead in it*, *put the bead in the bucket*, and then *reward* (clap, clap).

4. One thing we want to work on early is matching and sorting tasks. Early language involves a one-to-one correspondence between a word and an object, or a word and an action. If the child can't match, then show him or her how to *sort*. Put all the "somethings" over here and all the "something elses" over there. That kind of basic sorting can lead you into some matching activities that are good for teaching signs and words. Don't match by color, form, or touch until much later because it's very abstract and is removed from the one-to-one correspondence between sign and object. If you teach the child that this is a coat, and you come back to it later and say, "What is it?" and s/he says "coat," and you say, no, no, *blue*, you've just erased that matching of sign-to-object. Anytime you refer to any physical characteristic of an object, you're abstracting from the object.

5. Be very careful to understand what you're teaching so you don't move too fast for the child. If you've taught the child to associate a word with an action and a word with an object, what have you got? The basis of a sentence. You're building a sentence and you want to build your communication utterances on the basis of

verb + noun, or verb + object, or modifier + noun.

6. We must discover how each child learns best. Imitation is a very important technique, except when you have an echolalic child like Sharon. Then you don't want imitated responses, only meaningful, generated utterances. Even in imitating familiar words, we must start with what is meaningful for the child, what s/he sees and what s/he does. The child must experience a one-to-one correspondence between the sign and the meaning. Otherwise we're only asking for rote imitation, which does not lead to communication skills.

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THE SENSES

APPLICATION OF BASIC AUDIOLOGICAL PRINCIPLES TO THE DEAF-BLIND CHILD

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The topic of audiological management is a broad one which includes procedures used in assessment, follow-up procedures, medical referral, hearing aid evaluation, hearing aid management and maintenance, aural habilitative procedures, parent and teacher contribution, and others. This paper will limit itself to two areas: assessment procedures and interpretation of audiometric tests, and hearing aid management and maintenance.

The purpose of discussing the evaluation procedure is to provide information that audiologists attempt to obtain from the child who is suspected of having a hearing impairment. This paper will review the basic tests that are administered, give examples of data to obtain, and provide a basic concept of the interpretation of the tests. In addition, this paper will present data collected at the Callier/UTD Center in its Deaf-Blind Program.

In discussing hearing aid management and maintenance, it is the goal of this paper to present data which will convince professionals that a hearing aid maintenance program is a necessity for all young children wearing amplification, especially those with multiple handicaps. Some relatively practical ways of checking hearing aids are given so that the professional can be assured that adequate amplification is being provided through a properly functioning hearing aid. The author believes that "the hearing aid that is not checked is the hearing aid that is not working."

Evaluation Procedures

Audiological evaluation procedures can be dichotomized into behavioral and nonbehavioral techniques. Behavioral techniques are those that rely on an intentional or nonintentional overt response from the child when or shortly after an auditory stimulus is presented. Raising one's hand when a sound is presented or turning one's head to the source of a sound are examples of overt responses to sound.

Nonbehavioral tests do not rely on overt responses. Rather, tests using nonbehavioral techniques rely on physiologic body change to sound. Included in this category are: impedance measurement of the middle ear, evoked auditory response, electocochleography, respiration audiometry, and heart rate audiometry. The galvanic skin response is another type of nonbehavioral response that has been employed for assessing auditory sensitivity, but few audiologists believe in the practicality of the method. The presentations (Cooper, Harlow, Harris, Martin, and Meyerhoff) provided a good deal of information on impedance measurement. One can readily see the advantages of this testing in the audiologic and otologic management deaf-blind children. Later in this presentation the author will review data from impedance measurement that were collected in the Callier/UTD program for deaf-blind children. This will be the only exception in discussing nonbehavioral testing techniques. That is not to say that nonbehavioral tests are unimportant in evaluating special populations such as the deaf-blind. The author believes that in the future, after experimentation and certain technological advances, the nonbehavioral testing technique will provide more diagnostic information in a shorter period of time than it is possible to obtain with behavioral tests.

There are two reasons for directing the reader's attention toward behavioral tests. One is that, with the exception of impedance measurement of the middle ear, nonbehavioral testing is unavailable on a widespread basis. In Texas, for example, there are only two evoked auditory response laboratories evaluating patients. One is the lab at Callier Center/UTD and the other is Dr. Jerger's laboratory in Houston. Moreover, no one is using electrocochleography, heart rate, or respiration audiometry in Texas. That means that most professionals do not have any exposure to data coming from this form of testing. The second reason, and most important, is that the author believes that even if nonbehavioral test data were available on a child, behavioral data will still be needed in order to provide adequate educational programming.

The nonbehavioral audiometric test gives valuable diagnostic information, but in its present state the information is limited simply to telling what a child's responsiveness is to an auditory stimulus; no information is provided about the child's ability to integrate or process sound. Behavioral tests, when they can be applied, tell more than what a child responds to. However, as the data will point out, many times behavioral data cannot be obtained for many children, especially multihandicapped children such as the deaf-blind. Also, there are frequent cases where it requires an extensive period of time to obtain the data. Thus, the nonbehavioral tests become very important because they provide a starting point in determining auditory sensitivity for educational placement and management.

Types of Behavioral Testing

Behavioral testing procedures include behavioral observation audiometry (BOA), conditioned orientation response audiometry (COR), play audiometry, and conventional audiometry. BOA is a gross form of testing. When BOA is administered, the audiologist simply observes the child for any type of response to sound.

These responses may be reflexive in nature, such as startle responses, or they may be voluntary, such as localization responses, quieting, initiation of activities (laughing), etc. Behavioral observation audiometry must be considered a gross form of testing. With BOA the audiologist obtains an index of the child's ability to respond to auditory stimuli. Many times with this form of testing the sounds are presented through loudspeakers or "sound field," rather than through earphones.

COR is a form of audiometry in which visual reinforcement is provided when a localization response occurs. With this form of audiometry, the child is placed in a sound room and stimuli are presented first through loudspeakers. Mounted on top of or in close proximity to the loudspeaker is a novel object, such as a clown's face, or plastic animal which, when illuminated, provides visual reinforcement. Once the localization behavior has been established, earphone testing can sometimes be used. Although one might assume that COR audiometry is not applicable to the deaf-blind population, it can be successfully applied to some children, usually those older than five or six years.

In play audiometry it is assumed that the activity being used is interesting to the child and that making a response is rewarding. A typical activity used in play audiometry is to involve the child in such activities as dropping a block in a bucket or stacking blocks on a peg when a sound stimulus is presented. Play audiometry is not applicable to difficult-to-test children without a period of test training. During the test training sessions the audiologist, or many times the teacher or parent, works with the child to train him/her to respond to a stimulus. In the training sessions a bright light (flashlight) or vibro-tactile energy is used as the stimuli. Once the response is established, the audiologist can then generalize the response to calibrated sound stimuli. Play audiometry can be successfully used with deaf-blind children, usually in the eight to ten year age bracket.

In conventional audiometry patients raise their hands or press the signal button when a sound is perceived. The individual is usually given verbal instructions, and a brief demonstration precedes the test. Conventional audiometry typically is not applicable in testing special populations of children.

A hierarchical order of behavioral testing procedures can be applied to difficult-to-test children. As one progresses from BOA to conventional audiometry, the sophistication required of the child in making a response increases. Because of this, the more sophisticated tests can be applied to the older child; or, as a multihandicapped child increases in mental age, his/her skills will increase and more sophisticated test procedures can be used.

Another important point is that as the sophistication of the procedure used to obtain the audiometric data increases, more confidence should be placed on the results. When reviewing audiometric data provided on a given child, it is important to know the testing procedure used to obtain the information. For example, if audiometric data obtained by BOA are not consistent with hearing skills regularly shown in the classroom, it may be that the inconsistencies are related to the gross form of audiometric tests performed, and retests should be scheduled. However, when play audiometry is employed, such inconsistencies are less likely to occur.

The Audiometric Profile

Ideally, every audiometric profile should contain the following information for each ear:

1. Pure tone air conduction thresholds*
2. Pure tone bone conduction thresholds*
3. Speech reception thresholds*
4. Word discrimination scores (quiet/noise)*
5. A tympanogram (static compliance)*
6. Acoustic reflex thresholds*

In addition, differential loudness summation testing helps to predict hearing loss. This test was described by Jerger, Burney, Mauldin, and Crumpjit (1974) uses acoustic reflex information when pure tone and wide-band and narrow-band noises are utilized to elicit the reflex.

Case Studies

Case Study 1 - These data are from a 4-year-old-child who was enrolled in the deaf-blind program at Callier. The responses shown on the audiogram were obtained using BOA and were recorded to sound field presentation (through loudspeakers). A total of five formal test sessions were required to obtain these data.

The results would suggest that the child has hearing sensitivity essentially within normal limits. However, because the stimuli were presented using loudspeakers, if there is a difference between ears, only the better ear is being tested. Note

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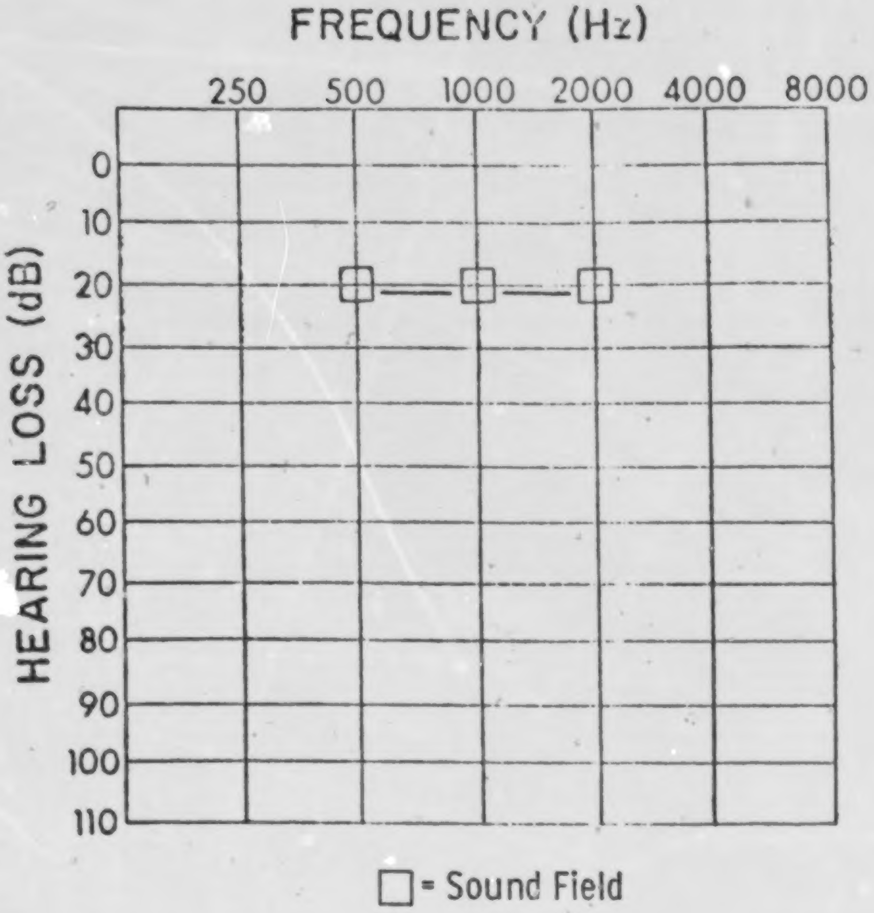
*In the verbal presentation the procedure for administering each of the standard tests was reviewed, and examples of profiles representing normal, conductive, mixed, and sensorineural hearing loss were presented.

COMMENT: Case Study 1 Age 4 0 years Test procedure-BOA



	* SRT	Word Discrim.		Tympano-gram	Static Compliance	Acoustic Reflex	Differential Loud. Sum.
		quiet	noise				
Right Ear	CNT	CNT	CNT	Type A	.70 cc.	WNL	Normal
Left Ear	CNT	CNT	CNT	Type A	.60 cc.	WNL	Mild-Mod.

WNL = within normal limits of 70-90 dB HTL
CNT = could not test
•Sound Field Speech Awareness Threshold = 30 dB HTL

that SRT and word discrimination could not be tested. Also, tympanograms were normal (Type A), and static compliance and acoustic reflexes were normal, but the possibility of a left ear mild to moderate hearing loss was predicted using differential loudness summation.

With this child earphone tests would be needed before it could be determined that both ears were, in fact, within normal limits. Also, further attempts to obtain an SRT and word discrimination should be made. However, unless further testing proves differently, this child could be considered as hearing within normal limits and educational programming could be planned accordingly.

Case Study 2 - These data are from a 3.4-year-old multihandicapped child. Sound field tests were performed using BOA over three formal test sessions; these tests consistently revealed responses within 5-10 dB of those shown on the pure tone audiogram. This child would be classified as severely hearing impaired by pure tone tests.

Speech awareness revealed a difference between ears, the right ear having a response of 74 dB and the left ear no response at 100 dB. This information suggests that the right ear is probably the ear being tested by sound field. It also indicates that any amplification should be directed to the right ear.

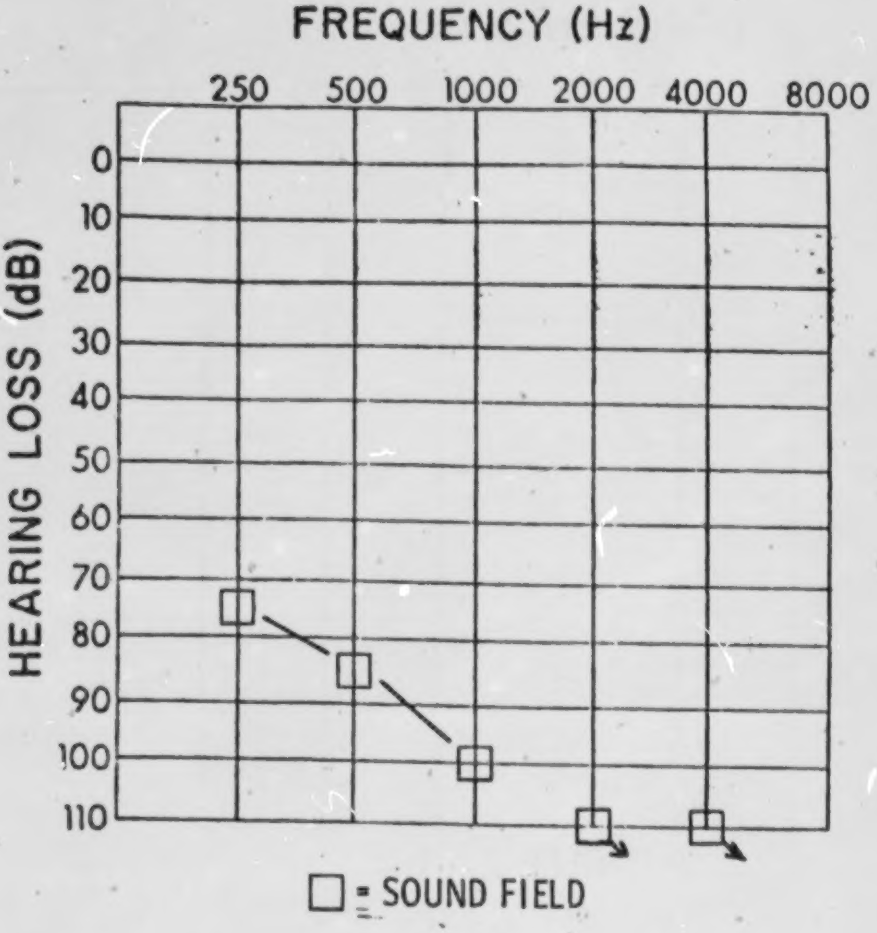
Results from impedance are consistent with behavioral tests; normal tympanograms and static compliance with an absence of reflexes. Overall, the diagnosis would be a severe to profound bilateral sensorineural hearing loss, with the right ear most likely having better sensitivity than the left. A hearing aid evaluation would be recommended, and educational programming for severely hearing impaired children initiated.

Case Study 3 - In this case COR audiometry could be utilized. Two formal evaluation sessions were required to test this 4.1-year-old child, who had a visual problem and a suspected hearing loss. Pure tone data at 500 and 2000 Hz suggest either normal or near normal right ear hearing sensitivity and a mild to moderate left ear hearing loss.

Speech awareness thresholds were consistent with the pure tone information. Impedance measures supported pure tone findings and indicated no middle ear pathology, suggesting the loss to be sensorineural.

Overall, this child would be classified as having a mild to moderate left ear sensorineural hearing loss with normal right ear hearing. Because the right ear is thought to be normal or near normal, educational planning with auditory stimulation would be considered. Because COR was used with this child, the validity

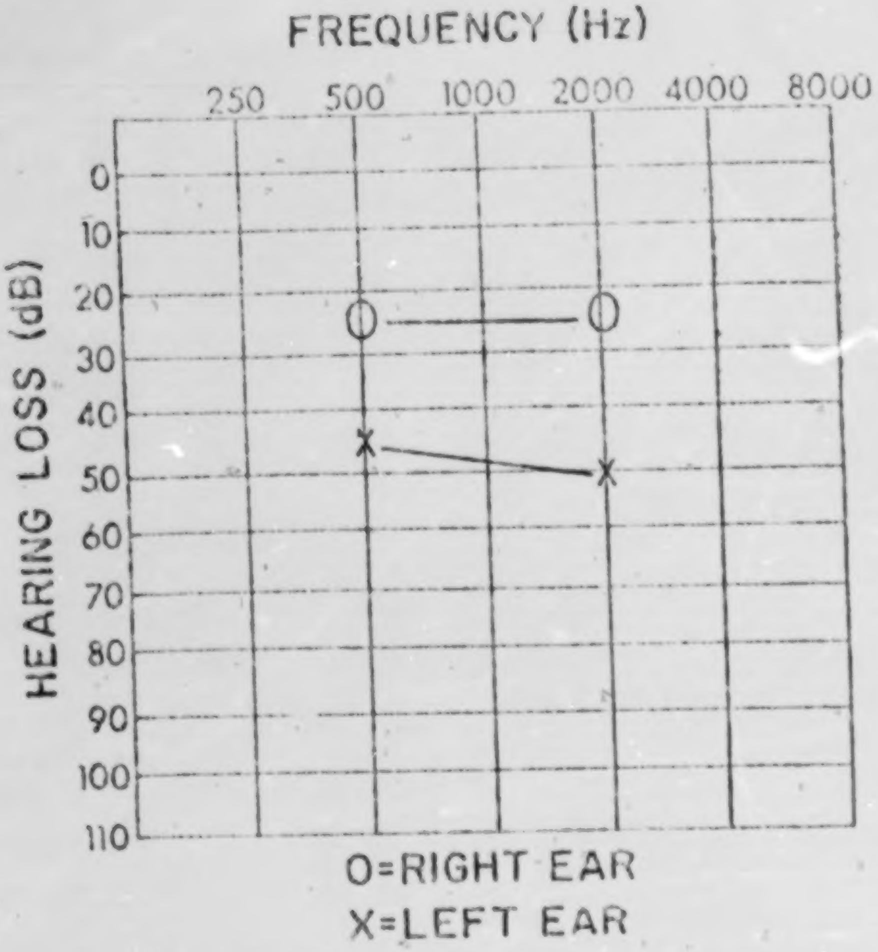
COMMENT: Case Study 2 Age 3.4 years Test procedure-BOA



	•SRT	Word Discrim.		Tympano-gram	Static Compliance	Acoustic Reflex	Differential Loud. Sum.
		quiet	noise				
Right Ear	74dB	CNT	CNT	Type A	.92 cc.	Absent	DNT
Left Ear	100+	CNT	CNT	Type A	1.09 cc.	Absent	DNT

•Speech Awareness Threshold
••CNT=Could Not Test
•••DNT=Did Not Test

COMMENT: Case Study 3 Age 4.1 years Test procedure- COR



	SRT*	Word Discrim.		Tympano-gram	Static Compliance	Acoustic Reflex	Differential Loud. Sum.
		quiet	noise				
Right Ear	20	CNT	CNT	Type A	.70 cc.	WNL	Normal
Left Ear	40	CNT	CNT	Type A	.60 cc.	WNL	Mild -Mod.

CNT= could not test
WNL= within normal limits of 70-90 dB HTL
*Speech Awareness Threshold

of the results was felt to be good. However, additional audiometric testing is needed to test other frequencies and to obtain additional speech data.

Case Study 4 - In this case study, data from impedance measurement alone are presented from a 4.3-year-old deaf-blind child; tympanograms and acoustic reflex data are shown over a six-week period. This child was untestable using behavioral audiometry. However, tympanometry and reflex data could be obtained on this child.

Results of the first test showed abnormal middle ear function. Otologic referral was made and treatment initiated, with consequent fluctuations in the state of the middle ear, as determined by impedance measurement. After six weeks normal middle ear function was found.

These data show how impedance measures can be used to detect the presence of abnormal middle ear function and how to follow the course of the disorder after treatment has been started. Since middle ear disorders produce concomitant hearing loss, in all probability this child would have had some loss of hearing, or additional hearing loss, during the six weeks the middle ear dysfunction occurred.

Impedance measurement has occupied a large amount of time during this conference, and rightly so. In Table 1, findings from 38 ears for tympanometry and 30 ears for acoustic reflexes are presented. All of these data are from children enrolled in

TABLE 1

SUMMARY OF IMPEDANCE FINDINGS

Tympanometry (n=38 ears)	
Type A	11(29%)
Type Af	1(3%)
Type B	17(45%)
• Type C	9(23%)

•-100 mm/H_2O or less

Acoustic Reflexes (n=30 ears)	
Present	5(17%)
Partial	3(10%)
Absent	22(73%)

COMMENT: Case Study 4 Age 4.3 years Test Procedure-Impedance

	Week	1	2	3	4	5	6
Right Ear	Tympanogram	B	C	C	B	C	A
	Reflex	Abs	Abs	Elev	Abs	Elev	Norm
Left Ear	Tympanogram	C	C	C	B	C	A
	Reflex	Elev	Elev	Abs	Abs	Elev	Norm

Abs = Absent at Maximum Output
Elev = Present at HTL's between 100 to 120 dB
Norm = Present Within Normal Limits of 70-90 dB HTL

the deaf-blind program at Callier Center/UTD. For tympanometry a large percentage of ears showed abnormal findings. In fact, 71%, or 27 of the 38 ears, had type A_f, C, or B tympanograms, with the most frequent being the Type B. These data are alarming, because there is certain to be a conductive hearing loss complicating the already difficult educational process for these children.

One point that must be mentioned regarding impedance measurement that is frequently overlooked is that not all children are testable with this technique. Table 2 presents data from 22 children enrolled in the Callier/UTD Deaf-Blind Program. The information provided is the number and percentage of children testable by impedance measurement. Tympanometry could be applied to one or both ears in 19 of the 22 children. This represents 86% of the population. However, acoustic reflex information could be obtained for only 15 of the 22 children, or 68% of the population.

TABLE 2

APPLICATION OF IMPEDANCE
MEASUREMENT
(n=22)

	TYMPANOMETRY	ACOUSTIC REFLEX
NUMBER OF CHILDREN TESTABLE	19(86%)	15(68%)

The degree of success with impedance measurement depends largely on the clinical ability of the audiologist. However, even the most sophisticated examiner will have difficulty in testing some children. Callier was 86% successful in applying tympanometry and 68% successful in the application of acoustic reflex measurement. The majority of children who were untestable with impedance audiometry were hyperactive and could not maintain a quiescent state long enough to successfully complete the test.

Hearing Aid Maintenance

Many professionals involved in programs for hearing impaired children forget that a hearing aid is an electronic device prone to all the failures of any electronic device. They assume that the hearing aid will not malfunction. Little attention is paid to data from studies on hearing aid usage.

Actually, Gaeth and Lounsbury (1966) reported the first longitudinal data in which electroacoustic analysis was performed on hearing aids worn by children. Hearing aids used by 134 hard-of-hearing children were evaluated. When the mechanical conditions and the gain of the hearing aid were considered, as many as 84% of the instruments were found to be inadequate. With permissive standards only about 50% of the children were found to be receiving adequate benefit from their hearing aids. Moreover, at least one half of the aids were found to have significant physical defects, including distorting or noisy amplifiers, cracked receivers, low or dead batteries, and excessive feedback.

Data supporting those of Gaeth and Lounsbury have been reported by Coleman (1972), Zink (1972), and Porter (1973). In each of these studies, the hearing aids worn by children enrolled in educational programs were evaluated, and approximately 50% were found to have significant malfunctions causing improper amplification. Porter (1973) indicated that 77% of the malfunctions observed in his survey were problems which were easily detected by a simple inspection procedure. Dead batteries, broken switches, and defective cords and volume controls accounted for the majority of the defects.

Callier's observations have been similar to the data reported above. Annual surveys of the hearing aids worn by children aged three to twelve years who were enrolled in the Callier Center program have typically shown that from 30% to 40% of the aids have significant malfunctions due to physical or operational factors. The major physical defects accounting for the malfunctions have been: low or dead batteries (30%), reduced output (15%), high levels of amplifier noise (17%), defective switches (11%), distortion (10%), and broken cords (9%). In some instances, the hearing aid was simply turned off.

Ideally, electroacoustic analysis should be performed routinely on all hearing aids to ensure proper function using anechoic test chambers and trained personnel. In addition, educational programs ought to develop rigid schedules for batter replacement and present training seminars on hearing aid maintenance for parents and teachers of hearing-impaired children (Coleman, 1972).

Although such measures are strongly urged, from an economical viewpoint they are not feasible for many programs, especially for those with small numbers of children. The cost of a simple test box is from $1,200 to $1,500, far too much for many programs.

There are, however, two devices that can be used to perform simple hearing aid checks. One is a battery tester and the other a hearing aid stethescope. Both of these instruments can be purchased for a total price of $20 (Hal-Hen Co., 36-14 Eleventh Street, Long Island City, New York 11106) and can be used effectively with little training.*

I strongly urge you to secure these instruments and to monitor the hearing aids in the programs you are affiliated with. Each hearing aid should be checked at least once at the beginning of the day; an even better program would be to check them in the morning and again in the afternoon.

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*In the presentation the manner in which the instruments are used was demonstrated.

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VISUAL DEVELOPMENT

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Vision originates in the eye, but we actually see with our brain. A defect in the eye may cause interference in the transmission of the picture to the brain, which interferes with seeing. There are many parts of the eye, but for this discussion only a few critical structures will be described and their functions and abnormalities discussed.

The clear window of the eye is the cornea, and just like any other window, if it becomes cloudy, a clear picture cannot pass through it. The pupil is a hole in the iris. The iris controls the size of the pupil by dilation and constriction. This regulates the amount of light entering the eye. Immediately behind the pupil is a structure called the crystalline lens. This lens in persons with normal vision changes shape to allow them to change their focus from distant objects to near ones. Any cloudiness or opacity in the crystalline lens results in a poor transmission to the back of the eye.

By definition a cataract is any opacity of the crystalline lens. With deaf-blind children who have congenital cataracts, the crystalline lens is the structure that is affected. In order to allow for clear transmission to the back of the eye, the cataract must be surgically treated. That is, removal of part or all of the crystalline lens is necessary in most cases of cataracts that blur transmission of an image. The inner layer of the eye is called the retina. This is the nerve layer of the eye and contains a layer of cells called rods and cones. The rods of the eye are the receptors of objects in the peripheral field, and in subdued light, the cones are the receptors of central vision and of color. Rubella children may have an abnormality of the retina called rubella retinapathy, which causes areas of the retina to be nonfunctioning. This results in blank spots in the visual field. Children who are presented with an object in an area within a blank spot do not see it. Rubella is a major cause of deaf-blindness in children, but in adults the major cause is Usher's Syndrome, or a combination of neural deafness and retinitus pigmentosa. The deafness associated with Usher's Syndrome is congenital, but the retinitus pigmentosa usually does not show up until after the first decade of life and begins very slowly, with the first symptoms being night blindness and loss of peripheral vision. Retinitus pigmentosa affects the rods of the eye, and they degenerate from the periphery inward. In some cases the person is left with tunnel vision, but with others complete loss of sight may result.

Glaucoma is the result of abnormally high intraocular pressure. Children suffering from rubella may have a higher incidence of glaucoma than normal children. Many of these children respond to treatment, while others lose their sight even with adequate medication or surgery.

There are three major components of vision: sensation, visual-motor, and visual perception. Sensation occurs when the eye receives a clear image on the retina and passes this image along to the brain for interpretation. Any defects of the eye, such as cataracts or retinapathy, keep the eye from receiving a clear image, and interfere with sensation. In addition to ocular pathology, refractive errors may affect sensation. Nearsightedness (myopia) occurs when the image falls in front of the retina. Farsightedness (hyperopia) occurs when the image focuses at a point beyond the retina. Astigmatism occurs when the cornea or crystalline lens is not spherical and there is not a point focus. Visual acuity refers to the sharpness of vision. Usually, as the result of spectacles or contact lenses, refractive errors are corrected and visual acuity improves.

The visual-motor component of vision pertains to the musculature of the eye and the coordination of the eye with the hand, foot, or another part of the body. There are six muscles attached to each eyeball that involve proper alignment and coordination of the eyes. A ciliary muscle within the eye allows focusing of the eye from distant to near points. This is referred to as accommodation. Another set of muscles allows the pupil to open and close to allow the proper amount of light to enter the eye. There may be serious deficiencies in the visual-motor system in which the eyes do not work together as a team. Strabismus occurs when one eye turns and is not parallel with the other. This is not unusual in multihandicapped children. The eye that is turned is generally the suppressed eye; that is, the brain turns off the image of that eye to keep from seeing double. The earlier the strabismus is detected, the sooner the remediation can begin. Visual training, glasses, or surgery may be needed to relieve the strabismus. Another ocular motor difficulty which is not as serious as the actual turning of an eye is called phoria. This occurs when there is a tendency for an eye to turn but the eye is held straight with effort. The phoria should be relieved if it is significant in order to prevent eye fatigue and to keep visual efficiency after use. Many deaf-blind children have not developed skills in the visual-motor area. They have not learned to aim or to properly focus their eyes, so they must be taught. The first thing the child is taught is to look at objects and to look at the person's eyes with whom s/he is working. Eye contact is something that many children have to be taught.

The third area of vision is visual perception. Whereas sensation and the visual motor component occur primarily in the eye, visual perception occurs in the brain. The signals from the eye are sent to the brain for interpretation. The brain is sometimes compared to a giant computer in which information is stored and then retrieved. With visual perception, experience is added to the visual image received for proper interpretation. Most deaf-blind children have been deprived of visual experiences. These visual experiences should be learned early in life for proper visual development, but visual perception does not develop as rapidly in deaf-blind children as in normal children because of sensory deprivation. Several segments of visual perception are important. One is "accuracy of perception," in which one learns detection of details. The second is "rate of perception," which is how quickly one perceives. Another segment is "figure ground skills," in which the subject can identify an object in a confusing background. Another skill is "visual memory," which involves short- or long-term visual memory. With long-term visual memory rehearsal has taken place to fixate the perception for later recall.

Associated with visual memory is visual sequencing, in which objects are perceived in an ordinary sequence. The area of sensation can rarely be improved, except by glasses or other optical means, but not by educational means or by experience. For example, persons seldom can learn to improve their visual acuity. However, visual-motor and visual-perception skills certainly are learned and can be improved by experiences and by proper educational procedures.

This leads into the topic of visual development of a normal child compared to that of a child who is blind or partially sighted. Only recently did doctors learn the extent to which newborn infants saw in all areas of vision. With new techniques doctors have discovered that the newborn child's eyes are sensually intact; although the newborn has a surprisingly good acuity, it has not learned how to understand and use its vision. The area of sensation seems adequate, but the areas of visual motor and visual perception are not developed. As the newborn progresses it rapidly learns how to aim its eyes and how to interpret what it sees. For example, at one month an infant is able to follow slow-moving targets and begins binocular coordination. At two months the infant pays some attention to objects up to six feet away and prefers simple to complex patterns. At three months the eye movements become smoother. Binocular vision has improved, and the infant notices color differences. At four months infants are interested in small, bright objects; smile at moving faces; and move toward an object in the visual field. At five months eye-hand coordination develops, and infants become successful at reaching for objects. They start looking intently at objects close to their eyes and examine objects with their eyes rather than using objects only for light play. At six months they shift visual attention from one object in the visual field to two or more objects. They recognize a face up to six yards away and rescue an object dropped within their reach. At seven to eight months of age they are able to manipulate objects. Both eyes hold and converge equally.

Unfortunately, completely blind children have no vision to reinforce their general motor development and fall far behind the sighted child in general overall motor skills. For example, the sighted child is able to sit alone momentarily from a median age of 5.3 months, whereas the completely blind child's median age for the same skill is 6.75 months. The sighted child can sit alone steadily from a median age of 6.6 months, whereas for the blind child it is eight months. The sighted child is able to raise itself to a sitting position at age 8.3 months, where it takes 11 months for the blind child. The sighted child can stand up using furniture and pulls up to stand at age 8.6 months, whereas it takes 13 months for the completely blind child. The sighted child's median age for walking alone across the room is 12.1 months, while the blind child's median age is 19.25 months. The sighted child is able to use its visual skills for grasping and reaching early because vision develops early. The completely blind child has to depend on auditory skills to a great extent, and these do not develop until near the end of the first year; thus, the child is very far behind in its exploring because it does not have vision for reinforcement.

A deaf-blind child is even farther behind, and teachers of rubella children know that it is not uncommon for their general developmental stages to be far behind those of a sighted child. Many of these children do not walk until age four to eight years and beyond. Some do not learn simple self-help skills until later in life. All sighted children do not follow the same developmental pattern; the same holds true for deaf-blind children. There is a general developmental scale for them to follow, but there are many children who veer away from an ordinary sequence of development. One characteristic of a deaf-blind child is an uneven development rate. Developmental scales certainly are valuable for teachers to understand which skills should develop first, but they should not be followed as a cookbook because of uneven development in deaf-blind children. It is not unusual for a child to skip two or three developmental steps before it picks up the ones it should have learned earlier.

It is not unusual for a rubella child to be born with congenital cataracts. If this occurs, the child's vision should be restored as quickly as possible; that is, surgery should be performed as quickly as the child's medical condition will allow so the child can learn visual skills as early as possible. The child may have passed many critical times in visual development, and these should be restored as quickly as possible. After surgery either glasses or contact lenses should be given to the child, who should learn to use them just as soon as possible. The refractive error that occurs after cataract surgery is the result of the removal of the crystalline lens. This amount of power has been taken out, so it must be restored either with glasses or contact lenses. Bifocals are usually prescribed in either glasses or contact lenses so the child can view near and distant objects comfortably. The earlier they are prescribed for the child, the quicker the child seems to adapt to them. After glasses or contact lenses have been fitted, the child needs to relearn the visual experiences that s/he missed: to look at lights, to look at form, to aim at objects, to learn eye contact, to fixate on objects, and to learn eye-hand coordination. These need to be learned in an organized, sequencial manner. Children who miss these skills will often learn other ways to compensate, so they may not learn visual skills on their own without encouragement and educational training. Some children learn quicker than others, and some children learn self-help skills and preacademic work rapidly, but for the most part, progress is very slow.

The low-functioning child generally makes little use of low-vision aids, but they may be very valuable to a high-functioning child. Low-vision aids are optical or nonoptical. An example of a nonoptical, low-vision aid is large print. A very common optical low-vision aid is a magnifying glass. Children who have retinatitus pigmentosa or some other defect which causes limitations in the visual field may make use of special glasses to increase the visual field. These are called field expanders and may be prisms or wide-angle lenses. When low-vision aids are prescribed, the child is seldom able to use them immediately. This is a new way of seeing for the child, and s/he must learn. A proper low-vision case is one in which the low-vision aid is properly prescribed and the child is properly taught by professional persons, including a teacher, parent, and all others who come in contact with the child. It is a relearning process to use visual skills, and therefore it is an educational aid as well as an optical aid.

Teachers should be able to interpret professional eye reports of their children, and they should also be able to do some informal testing. The professional eye examiner only sees the child for a short time, usually from 30 minutes to three hours. It is very difficult to get a typical reaction from the child in this short time. Many of the professional examiners do not know sign language or other ways to communicate with the child; therefore, valid measure of visual acuity or visual field are impossible. The teacher, on the other hand, works with the child in its own environment and can get a more valid measure of visual acuity, visual field, and other visual skills. This is very important because many low-functioning children become very frightened in a different environment and around strangers.

As suggested in A Vision Guide for Teachers of Deaf-Blind Children, a teacher's visual evaluation form should be given to children throughout the year to validate their level of visual functioning. Once this is determined the teacher can then select the next higher level to teach the child. Visual training should not be done in isolation. It should be incorporated during other times of teaching, such as during auditory or tactile training. One particularly opportune time for training is during feeding. Children should learn to use their visual skills while they are learning to eat because they are highly motivated in many cases to see the food, to use eye-hand coordination, and to interpret what they are eating or drinking.

The deaf-blind child usually loves routine; therefore, training should be done on a regular basis. Mobility, sensory-motor training which includes visual skills and visual-auditory coordination is a good example of coordinating vision with other senses. The teacher should understand the student's strengths, weaknesses, development, and variance from usual scales of development. S/he should learn to judge when to start a program and when to complete it. S/he should learn how to motivate the child and how to be compassionate. Understanding the visual process gives the teacher some insight into understanding the entire child.

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WORKSHOP IN VISION STIMULATION AND TRAINING

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When evaluating and training the visually impaired multihandicapped child, it is essential to consider the needs of that individual child. The most efficient way to accomplish this, we have found at the Upsal Day School for Blind Children in Philadelphia, is to take advantage of the input from every available discipline.

The effectiveness of the vision stimulation program is dependent upon the sharing of information from the child's parents; classroom staff; physical and/or occupational therapist; adapted physical education instructor; orientation and mobility instructor; art, speech, and music therapists; optometrists; and others.

This workshop will provide a description of the Upsal vision stimulation contract, ways of functionally assessing the child's vision, and the vision stimulation sequence and equipment used at Upsal Day School.

Reports received from optometrists and ophthalmologists typically are vague and do not give the care givers any more information than what they have already ascertained. Comparisons of a "clinical/sterile evaluation" and an evaluation in a functional setting are made, and emphasis is placed on educators and doctors having the need to mutually educate.

The Low Vision Clinic, currently functioning at Upsal, is described, and examples of how the teachers and doctors work together to adapt evaluation are discussed. Examples of these adaptations are given for response to any visual stimulus, acuity testing, field testing, and binocularity testing.

Evaluations that can be given by the teachers in the classroom are often an area of concern of the care givers for multihandicapped children. Adaptations by the vision stimulation team at Upsal of the "Functional Vision Screening for Severely Handicapped Children" by Beth Langley and Rebecca Dubose are described and partially demonstrated with children from the Lubbock State School.

Vision stimulation for multihandicapped children helps individuals use their vision to their individual potential and to add the functional vision system to the rest of their functioning modalities.

During the description of the vision stimulation sequence used at Upsal, particular attention is paid to those children with sensory integrative problems, cerebral palsy, hyperactivity, and nonreactiveness. Suggestions of how to help these children in order to facilitate better vision are made. Equipment is described as well.

The goal of the vision stimulation contract at Upsal Day School is to move the program into the classroom and the home in order to integrate vision in the total human being we teach.

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SENSORY STIMULATION, SENSORY INTEGRATION THEORY

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All motor output is in response to sensory input. Motor output, in turn, creates new sensory feedback. There is association between the old and the new sensory information, there is differentiation, followed by integration of sensory-motor-sensory behaviors. If this process is operational, an individual is able to adapt to the environment and develop a sense of both time and space. Gilfoyle and Grady (1976) refer to this process as the "spiraling continuum of spatial-temporal adaptation." Through adaptation the body learns to inhibit immature reflexes; to establish postural, equilibrium, righting, and protective responses; and to develop more highly refined fine- and gross-motor skills.

Neuromotor dysfunction occurs if the senses distort incoming sensory information and/or if an individual is unable to respond to this sensory information through motor acts. Causes of these types of perceptual motor problems may be organic, environmental, social, or emotional.

A deaf-blind child with an etiology of congenital rubella obviously suffers from distorted and/or greatly reduced auditory and visual input, which can be more confusing and maladaptive than a total lack of hearing or vision. Because the body is organized as an integrated whole, an interdependent system drawing upon all levels of the brain and on all the senses, dysfunction in one area will affect the efficiency and accuracy of functioning in another area.

To fully understand the importance of sensory integration it is necessary to have a basic understanding of the human nervous system. As vertebrates with higher levels of functioning evolved, the brain became larger and more complex. Man is distinguished by having the ability to interpret complex sensory information and therefore to execute extremely skilled motor responses. The newer, higher levels of the brain overlap the functions of the older structures so that all levels of the central nervous system are interdependent. This permits us to have what Ayres (1972) calls "plasticity of neural function" (p. 16). It is possible to function as a whole even though there may be dysfunction in one area. This possibility is increased when sensory stimuli with the most integrative effect on the various levels of the nervous system are provided through treatment.

The neural synapse is utilized in treatment techniques which emphasize learning, relearning, and adapting. Neurons are the functional and anatomical units of the nervous system.

They have branching fibers called dendrites which receive impulses. A synapse occurs when information passes from one dendrite to another. When synapses occur frequently a learning pathway is created. This makes it possible to do things subconsciously, such as playing chords on the piano. Disuse causes atrophy of the neural pathways and learning is difficult. Growth is influenced by early environment. There is a greater learning capacity when there is a greater chance for dendritic growth through sensory-motor experiences.

Approximately 90% of all incoming sensory stimuli do not reach a conscious level. Some of these stimuli go to the spinal cord and the gamma-loop system and never reach the brain. They are reflexive and nonintegrative. This makes sensory integration techniques particularly useful in treatment with lower functioning, nonambulatory deaf-blind children because the child is not required to make cognitive responses and does not need to actively participate. Learning occurs on an unconscious level.

Consciously or unconsciously, the brain attempts to integrate information it receives. However, before the brain can get sensory information from the various neurons, the neurons must reach a firing threshold. To reach this threshold some neurons require convergence of many impulses for discharge. The most common sensory modalities showing convergence are visual, auditory, tactile, olfactory, and vestibular. The implications of this are profound. For the visually and auditorily handicapped child, tactile and vestibular stimulation can be used in treatment in order to produce increased synapses, raise the firing threshold of the convergent neurons, and therefore to get information to the brain. Conceivably, using a treatment technique such as spinning a child in a hammock would then provide enough vestibular stimulation to fire a convergent neuron, which also contains auditory and visual information. All information would then reach the brain. However, the problem remains if the senses distort this incoming sensory information and/or if the individual is still unable to respond to this sensory information through motor acts. Another vital point is that neurological organization is "virtually completed within the first decade of life" (Ayres, 1972, p. 17). Early intervention is essential.

Basis of Rx Theory

The object of treatment is to relearn ways in which sensory information is received and interpreted. Sensory stimulation activates the brain, which should result in motor output and resulting adaptive behavior. The process includes stimuli, perception, motivation, reinforcement, and repetition.

The way in which treatment is applied is complex. Not only must the sensory input be of the appropriate intensity, it must also be varied so that the brain will more accurately perceive information. A variety of sensory input is going to determine what children perceive and what concepts they derive from it. Stimuli presented at too great an intensity cannot be utilized and absorbed. For example, if the television, radio, record player, and doorbell are all sending auditory stimuli at the same time, much of the information will be lost and perhaps none of it will be fully utilized. However, on the other extreme, too long an exposure to unchanging sensory input produces physiological, cognitive, perceptual, and affective impairment. The brain accommodates overly repetitive information and in effect ignores it. For example, when individuals first enter a room the buzzing of the flourescent lights may annoy them, but as they stay in the room and become involved in other things they no longer hear it. In this way the body selectively discriminates and eliminates useless information. Sensory nerve endings adapt to the stimuli and neurons are no longer fired.

There is not a standardized answer as to the level of intensity at which sensory stimuli should be provided. This is a very individual concern. It is dependent upon the neurological organization of each child. If a pattern of neural synapses is present, with an abundant number of aborized dendrites, there is a greater learning capacity, and information at a lower intensity can be used effectively and quickly.

Ayres (1972, p. 18) writes that the degree of relatedness between any one neuron and all other neurons varies as a function of use and with varying degrees of permanence. Some neurons require a more prolonged flow of impulses. Some children tolerate an amount of stimuli that would overwhelm others. Greater intensity of stimuli makes some synapses available to these children that would otherwise not be.

It is essential to determine, on an individual basis, the intensity requirements of each child, and this can only be done through observation. If a child fails to react to low intensity information, the child probably needs stronger forms of sensory input to cause a response. This is often typical of a hypotonic, lethargic child. Also, if a child has difficulty filtering information, the child may need a slower, more rhythmic, and lower intensity form of stimuli. This is often true of the hyperactive child. Use of sensory integration stimulation techniques are often frustrating to the instructor. There are no cookbook answers.

Rx Techniques

Sensory stimulation-integration techniques are designed to improve postural responses, including equilibrium, head righting, and protective responses. The primary types of sensory input to develop these automatic and primitive responses are vestibular, kinesthetic-proprioceptive, and tactile.

Vestibular refers to the system which responds to movements, balance, and equilibrium. The nerve ending begins in the inner ear (semicircular canals) and travels with the cochlear (hearing) nerve to the brain. The vestibular system is stimulated by spinning, swinging, rocking, or swaying. It is closely linked with the cerebellum in the brain. Together they help provide smooth and coordinated action and influence muscle tone. This input makes it possible to detect both linear and rotational motion, acceleration, deceleration, and gravity.

Proprioceptive input is provided through proprioceptors, nerve endings located in muscles, tendons, ligaments, and joints which indicate the sense of position of limbs in space without visual cues. They also perceive passive motion of a joint without visual cues. This knowledge of movements of the muscles of the body and position of the joints is termed kinesthetic sense.

Tactile input is provided as stimuli is received and interpreted through contact with the skin and exploration with the hands. When an individual manipulates objects, s/he attempts to discriminate temperature, texture, hardness, and contour. Meaningful tactile contact is integrated with information gained through vision and hearing. It influences visual and motor tracts in the central nervous system to create a richer, fuller experience. When tactile contact is disturbing or not meaningful, the individual tends to withdraw from the environment or become "tactually defensive."

Initially a neonate is unable to discriminate tactile stimuli. Withdrawal responses are reflexive and protect the infant. Later s/he values and uses touch. Some children remain oversensitive and disorganized. Their protective responses are still overriding. In essence, they are always ready to respond to danger. These children avoid passive or active contact with their environment. Other children, including many rubella deaf-blind individuals, need intense contact. Many can't seem to get enough.

Darnella (1973) studied tactile preferences among multihandicapped children to assess their responses to qualities of tactile stimuli. Rank order preference from most preferred to least preferred was vibration, cold, hot, nerf ball, sand, wood, brush, fur, and yarn. According to Darnella (1973):

> Besides reflecting possible effects of novelty, the subjects' responses seem to indicate (1) avoidance and protective responses of withdrawal toward light-touch stimuli as represented by yarn and fur balls, and (2) preference for a stimulus (vibration) associated with the discriminative system which may have an inhibitory effect on the protective system and facilitate the integration of incoming stimuli (p. 402).

Kinnealey (1973) states that there may be a central nervous system mechanism which controls stimulus intensity. When there is dysfunction in the central nervous system, perception of tactile stimuli is affected. The sensory receptors are more abundant in the palms of the hand, the soles of the feet, and around the mouth. If sensory stimulation is interpreted by the central nervous system as noxious, behaviors such as toe-walking, poor adaptive skills dependent on hand function, and feeding problems as seen in a hyper-reactive type child may be observed. Children with this type of problem may resist extremes in temperature and fixate on bland foods.

Kinnealey compared two subgroups. Those aversive to intense forms of sensory stimulation (hyper-reactive) and those who were nonaversive and required more intense sensory stimulation. For both groups there was a high positive correlation between the reactions to smell and taste stimuli. In the aversive group those who were tactually defensive were also defensive toward taste and smell. However, in the nonaversive group there was a negative correlation between taste and tactile reactions and a low correlation between smell and tactile modalities. For both groups vestibular stimuli seemed to be a positive stimulus, although the hyper-reactive individual had a greater aversion to vertical vestibular stimuli.

Whether using vestibular, proprioceptive, or tactile stimuli (or a combination of all three), the sensory stimulus-motor response-sensory feedback cycle is being utilized in hopes of having an integrative effect on various levels of the nervous system for a more totally functioning individual.

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SENSORY STIMULATION, SENSORY INTEGRATION: TECHNIQUES AND EQUIPMENT

Martha Dodd

Sensory Channels Used in Integrative Therapy

1. Vestibular System
2. Proprioceptive System
3. Tactile System

Desired Results of Therapy

1. Integrate primitive postural responses
2. Improve automatic postural responses
    - Equilibrium Reactions
    - Head Righting
    - Protective Responses

Equipment Needed

hammock
beach ball (36" dia.)
incline
barrel
trampoline
spring board
cylinder
scooter boards
vestibular board
tactile materials

1. Beach Ball
    a. Type of sensory input--vestibular and proprioceptive
    b. Reactions:
        1. Protective extension reaction
        2. Shifting of body weight to maintain balance
        3. Increase extensor muscle tone
        4. Stimulate vestibular receptors
    c. Child is prone; supine--feet held
    d. Movements--left↔right, forward-backward, oblique; discourage any predicted motion
    e. Bouncing--child sits and bounces on the ball. Also use movements described above.

2. Hammock--suspended from one point overhead, two ends meet. In using the hammock, the child can be lying prone, supine, sitting tailor style, or with feet touching the floor.

a. Type of sensory input--vestibular and tactile

b. Reactions:
   1. Stimulate vestibular receptors
   2. Improve extensor muscle tone
   3. Stimulate righting reactions

c. Spinning
   1. Child is fully supported in hammock; adult spins child
   2. Hammock is lowered toward the ground so child's feet touch the floor. Have the child spin himself by pushing off the floor with his feet. At this point, the amount and speed of spinning should be determined by the child's own response.

d. Swinging
   1. Child is fully supported in hammock; push the hammock (try not to touch the child) to start swinging motion.
   2. When child is able to do so, have him swing himself by pushing off the wall or floor.

e. Swinging and spinning
   1. Combine the swinging and spinning motions. Speed and amount are determined by the child's tolerance to the stimulation.

3. Barrel

a. Type of sensory input--vestibular, proprioceptive, and tactile

b. Reactions:
   1. Stimulate vestibular receptors
   2. Body righting reactions and trunk rotation

c. Child lies supine in the barrel. Roll the barrel so the child will roll to a prone position. Keep rolling the barrel so the child continues to log roll. Roll to the left and right.

d. Child tailor sitting in the barrel--rock child back and forth until he grows accustomed to the barrel and his position. If the child has sufficient trunk control, continue rolling him until he completes a backward roll.

4. Trampoline

a. Type of sensory input--vestibular and proprioceptive

b. Reactions:
   1. Maintain upright position and equilibrium
   2. Improve extensor muscle tone and posture
   3. Stimulate righting reactions

c. If the child cannot jump independently, sit behind the child with him leaning against you and bounce up and down. This can be done in lying, sitting, kneeling, and standing positions with close body contact.

d. Have the child stand on the trampoline, hold his hands and have him jump. If the child cannot jump by himself, jump him by holding him by the shoulders and help him jump up and down.

   e. Have the child jump unassisted if he is able to do so. Also, teach the child various jumping patterns such as seat drops and knee drops.

5. Cylinder
   a. Type of sensory input--vestibular, proprioceptive, and tactile
   b. Reactions:
      1. Head righting reactions
      2. Trunk lateral flexion and rotation
      3. Protective extension reactions
   c. Child lies prone over the cylinder; roll the child forward so his arms extend to catch himself. Repeat with the child lying in supine position.
   d. If the child is able to do so, have him lie over the cylinder and let him push himself back and forth.
   e. Straddle the cylinder and rock back and forth pushing off with one foot and then the other. If the child can do so, have him rock himself back and forth.

6. Vestibular board (rocking board)
   a. Type of stimulation--vestibular, proprioceptive, and tactile
   b. Reactions:
      1. Protective extension--sideways, forwards, and backwards
      2. Shifting of body weight to maintain balance (postural adjustment)
      3. Equilibrium reactions in all positions (lying, standing)
   c. Child can be lying supine or prone; sitting--rock the child back and forth so he rocks to the side and also a front and back motion. Avoid predictive movements.
   d. Child can crawl or walk across the vestibular board independently or with assistance.

7. Scooterboards
   a. Type of sensory input--vestibular and proprioceptive
   b. Reactions:
      1. Stimulate vestibular receptors
      2. Stimulate neck proprioceptors to increase neck and upper back extensor tone
      3. Shifting of body weight to maintain balance
   c. Child sits crosslegged and adult spins him in a circle.
   d. Child lays prone on the scooterboard and pushes off from a wall and can use arms to propel self around. This can be done in conjunction with ramps or in an obstacle course.
   e. Child sits on scooterboard and holds onto hoop, stick, etc., and adult pushes and pulls child back and forth.

8. Incline (wedge)
   a. Type of sensory input--vestibular and tactile
   b. Reactions:
      1. Stimulate vestibular receptors
      2. Tactile sensations

c. Child log rolls down the incline, roll to the left and right.
d. Forward and backward rolls down the incline.
e. For increase tactile input, have the child wear a minimum of clothing and roll on various textures--carpet, vinyl, wool, cardboard, plastic, etc.

9. Tactile sensations
   a. Type of sensory input--tactile and proprioceptive
   b. Reactions:
      1. Normalize the tactile system (touch-pressure)
      2. Provide proprioceptive input
   c. Massages--have the child lying down or in a dependent position. Stroking with firm, even pressure over the muscle bellies. Start proximal and work distally (trunk towards extremities).
   d. Whirlpools and baths.
   e. Rub child briskly with terry cloth towel after baths.
   f. Rub the child with a variety of textures over his trunk and then extremities--terry cloth, satin-like material, burlap; wrap the child in a blanket, stroke with fur or feathers.
   g. Allow a child to manipulate hot and cold objects, heavy and light, smooth and rough, large and small, round and square, and other shaped objects.
   h. Allow the child to wear 1 or 2 lb. cuff weights around wrists and ankles for 20 minutes at a time. This can be combined with wearing a heavy weight around one extremity and a lighter weight around the other.
   i. Allow the child to carry, push, and pull weighted objects.
   j. Allow the child to squeeze spongy objects with arms and/or arms and trunk. Other objects are inflatible balls, nerf balls, and balloons.
   k. Allow the child to roll standing up against a wall. When possible the child wears a minimum amount of clothing.
   l. Use of vibrators--vibrate over muscle belly. Allow the child to hold the vibrator to experience its sensation. Also, vibrator chairs and massagers can be used.

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COGNITION

SENSORIMOTOR COGNITIVE ASSESSMENT AND CURRICULUM FOR THE MULTIHANDICAPPED CHILD

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This presentation will acquaint teachers of students who are multihandicapped, deaf-blind, or severely/profoundly retarded, with assessment of very early cognitive behaviors and implications for curriculum. The sensorimotor period of cognitive development, defined for this purpose as concepts, reasoning ability, and mental representation is roughly equivalent to the first two years of life. This mental representation is prerequisite to symbolic thought and language development.

The assessment presented is that being utilized in the Infant Development and Deaf-Blind Programs at the Meyer Children's Rehabilitation Institute, Omaha, Nebraska, under the direction of Cordelia Robinson, Ph.D. It is derived from the work of Uzgiris and Hunt (1966, 1975) and Escalona (undated paper), based on the work of Piaget (1952, 1954), and adapted for our population by Dr. Robinson. This assessment is applicable regardless of age if the child is functioning at a sensorimotor level. Because the scales are ordinal, not normative milestones, they are designed in terms of the sequences in which concepts develop in several relatively independent cognitive areas. They are written as observable, measurable behaviors which demonstrate concept levels and are useful as a measure of child progress, in program evaluation, and in development of prescriptive curriculum for an individual child.

The subscales included in the Sensorimotor Cognitive Assessment are: (1) Visual Pursuit, Localization, and Object Permanence; (2) Development of Means for Obtaining Desired Environmental Events; (3) Development of Operational Causality; (4) Development of Motor Imitation; (5) Development of Vocal Imitation; (6) The Construction of Object Relations in Space; and (7) The Development of Schemes for Relating to Objects.

The criterion behaviors listed were derived for children with intact sensory and motor abilities and are quite visual in emphasis. Therefore, methods of task presentation and response may need to be adapted for children with sensory or motor handicaps. The work of Hauessermann (1958) has been a valuable source of adapted testing strategies and philosophy. Strategies and curriculum substeps often need to be individually developed because of varied combinations of handicaps, and we are slowly developing and validating curriculum, learning as we go along. We will describe some examples of task adaptations and of curriculum for some of the most severely handicapped children at the very beginnings of cognitive development, which may be of some immediate practical assistance to teachers.

Because motor handicaps are so visible, their effect on a child's total development may be more fully appreciated by a teacher, and motor management often plays a major role in the child's educational program. This paper will be concerned with the difficulty of sorting out mental and motor factors and the importance of designing activities for both areas. The child will not always be able to respond optimally to instructional-level cognitive tasks and instructional-level motor tasks at the same time. Research with the development of attention in infants by Wolff (1973) supports this common-sense approach.

The child's sensory handicaps probably have a greater impact on ability to learn, yet these are often undiagnosed or uncorrected. The impact of even a mild sensory deficit is greater in multi-handicapped children because they do not have the compensatory abilities of the otherwise normal hearing impaired or visually impaired child. For example, the normal blind child must learn to make meaning of what s/he hears through associations with direct experiences. When a blind child is motor handicapped, experiences are severely limited also, and it is very difficult to make meaning of environment and language. Meaning will depend on correlating or associating information from two or more sensory channels. For this reason, the development of any residual vision or hearing potentially available to a child is critical, and curriculum is developed for functional vision and hearing training as well as cognitive goals. Persistence in seeking adequate diagnosis and treatment for these problems is also needed.

Basic Schemes

With a severely/profoundly handicapped population one needs to begin with assessment and curriculum for the basic sensorimotor schemes normally present at birth--abilities for visual fixation and tracking, sucking, and grasp reflexes. As these behaviors come under voluntary control, they are the beginnings of cognitive development. The normal newborn also shows the beginnings of pattern and form discrimination in its preferential looking at stimuli such as black and white checkerboards or facial configurations. Although less well organized, auditory stimuli elicit alerting or listening responses. Severely handicapped children may lack these basic ways to deal with the environment and the ways to compensate for deficits.

Visual schemes. In our population we have children whose abnormal motor patterns and seizure activity interact with central or peripheral visual system problems to prevent the organization of the basic visual behaviors. These children may be unable to fixate or track or are labelled as cortically blind. Severe oculomotor system problems occur, such as strong deviation of eyes in one direction, with associated abnormal tonic reflex activity of the whole body. Primitive compensatory eye movements in the opposite direction of head movement (Doll's Eyes Phenomenon) may be retained and exaggerated, causing eyes to deviate with every movement of an unsteady head.

Initial sensory organization goals may be directed toward developing ability to fixate, to track moving stimuli, or to turn toward objects moving in from the peripheral visual field. Probes will explore differential responses to varying stimuli such as lights, patterned configurations, color, and faces.

Positioning may be a critical factor in developing these basic abilities. Our experience has suggested that supine positioning, with some flexion of head and legs to break up strong extension, head centered and fixed, is frequently the optimal condition for initial visual training. A head centering cushion has helped facilitate the freeing and centering of the eyes necessary for these children to begin to achieve a fixation. A slight tilt up, however, may provide more contact with the environment. Our experience with an institutional population has been that many children's deformities prevent positioning in chairs or beanbags, and supine positioning on a long wedge with high edge about one foot, and adequate head centering, may provide visual contact once some ability to fixate is achieved. In some instances side-lying will favor freeing eyes from lateral deviation (right side-lying for right deviation of gaze and head turn), while on the child's other side the deviation of gaze may be increased, preventing any fixation at all. It is important for teachers and therapists to investigate and measure basic visual abilities in different postures and to design interventions accordingly.

Visual responses may also be affected by the disorders of state and arousal which may occur as a consequence of central nervous system problems--constant sleepiness, irritable crying and inability to soothe, or very labile fluctuations between states are examples. A child may be easily overloaded by sensory input, responding pleasurably one second and crying the next. We have a great deal to learn about the effects of varying stimuli on disorders of state and arousal with our handicapped population. For example, different types of vestibular stimulation can have varying effects Bringing a child abruptly from supine to upright, or bouncing a little, has affected eye opening and alerting with several very lethargic children; this is similar to findings of Korner's research with neonates (Korner & Grobstein, 1966). Slow rhythmic rocking has enabled some very irritable and unsoothable infants to quiet and begin attending to outside stimuli. The visual organization of children with the complex deviations of gaze and poor fixations may be adversely affected by vestibular stimulation such as rocking or spinning, as they already have an exaggerated vestibulo-ocular reflex (Fieber, 1977). We feel it is important to carefully measure effects of any such stimulation on specific functional organization abilities such as fixation or on definable state changes. (See Lewis, 1972, Wolff, 1966, and Moss and Robson, 1970, for classification of states). Research with the differential effects of sensory stimuli on arousal level in infants may provide some implications for management of these problems (Birns, Blank, & Bridger, 1973; Brackgill, 1973).

Figures 1 and 2 illustrate the type of data we record in work with visual fixation or tracking. Baselines for visual fixation may determine (1) latency time to obtain a fixation in a given stimulus trial, such as 15 seconds; (2) duration of fixation; and (3) responses to varied stimuli--light or shiny, black-and-white checkered or bullseye patterns, colors, faces, and sound-visual versus visual alone. An objective can then be developed such as shortening latency time and then increasing duration of fixation. With careful analysis of ongoing records, objectives and strategies can be revised. Changes in stimulus preference may demonstrate increasing discrimination.

Baselines for visual tracking may determine (1) arc, (2) eye movements alone (ocular pursuit) or more advanced eye-head movements (oculocephalic pursuit), (3) direction, and (4) stimulus effects. Information may show changes from movement of one eye only to binocular coordination.

Long-term goals may need to be open-ended for maximal use of any potential vision, because expected outcomes may be unknown when training begins. Initial short-term goals may need to be stated as exploratory probes. Any improvement in functional vision can be important for a multihandicapped child, and goals in this area need to be ongoing, parallel to other curriculum. The boy shown in the slides, for example, has become able to fixate and shift gaze after many months work, but cannot track at all due to specific central vision system problems. Work with sensorimotor cognitive development proceeded, however, adapting task presentations, and he now is using eye-pointing to indicate named pictures in beginning communication board work.

Further information on assessment and curriculum for the children with complex sensory organization problems is described in Fieber and Robinson (1974) and Fieber (1977).

Grasp scheme. One of the most frustrating characteristics of some severely/profoundly handicapped children is lack of basic concepts of hands as tools with objects. The basic scheme of grasping is included as the beginning of the Schemes for Relating to Objects subscale--"Holds object 30 seconds." Grasp normally begins with automatic responses to stretch and touch, and during these automatic phases grasped objects are retained only very briefly. Voluntary grasp, or the "grasp scheme," normally appears as the reflex wanes, and the child retains grasp longer to maintain an interesting perception. Fisted hands begin to open, and an open

Figure 1

VISUAL FIXATION
Record of Probes

OBJECTIVE	ADMIN.	CRITERIA	FREQ	TRIALS						DESCRIPTIVE COMMENTS
				Date	Stim.	Latency Sec.	Duration 1st, Sec.	Freq. Fix. in Trial	R,L,B	
Visual fixation, 15 sec. trial, latency < 5 sec. duration 1st fixation 1-3 sec.$^{+}$	In Bobby Mac seat, head centered with cut-out Present visual and sound-visual sti. at mid-line, focal distance 6-8".	Pupil reflections eye(s) 5/5, 3 wk. in a row.	5X	9/19	V bear	1"	1"	several	L → B	
					VS bear	1"	1"	few	L	startled and lost
					V red Legg	< 1"	2"	several	L	Note: Alternate exotropia--though still favors left eye, may finally get both on stimulus and beginning to alternate exotropia, rt. eye centering at times.
					VS red ball	2"	2"	few	L → B	
					V mirror	0	0			
					VS rattle	3"	1"	few	L	
				9/24	V lite brite	2"	6"	several	L	
					V checker	3"	3"	several	L → B	
					SV bear	5"	2"	several	L	startle
					V checker	5"	2"	several	L	
					SV bear	3"	7"	several	B	
	Sidelying on rt. side, legs flexed, relax head before presenting. Wait for eyes to free		5X	9/26	V mirror	1"	1"	one only	B	went into extension
					V checker	1"	25"		B	rt. centered more
					V checker	2"	30"		B alt.	fix. Rt. & Lt.
					V colored pattern	2"	1"	one only	B	startled
					V red Legg	1"	5"	several	B	sl. exotropia rt.

Figure 2

VISUAL TRACKING
Record of Probes

OBJECTIVE	ADMIN.	CRITERIA	FREQ.	TRIALS											DESCRIPTIVE COMMENTS
				Date	Stim.	R,L,B	OP/OCP	Dir	Few°	<90°	90°	>90°	90°T.	180°	
Tracks with ocular or oculo-cephalic pursuit, partial arc (<90°) to visual or sound-visual stimulus, using both eyes. Trial 15 sec. to obtain fixation.	Head centered with cushion in supine tilt or on lap. Present stim. alternating visual and sound visual at mid. and move Rt/Lt.	Both eyes move with stim. and hold it, for criteria of 3/3 3 weeks in succession.	3X R 3X L	9/18	SV red ball	-	-	R	-						no vis. fixation
					V pattern	B	OP	L	+						
					V mirror	B	-	R	-						fixation, no pursuit
					V face	L	OP	L	+						
					V face	-	-	R	-						no vis. fixation
					SV mirror	L	OP	L	+						
					V mirror	L	OCP	L	+						
					SV silver Legg	L	-	R	-						fixation, no pursuit effort but no success

hand will encounter graspable things--body parts, clothing, crib environment. Children with tightly fisted hands, abnormal postures, and restricted movement may not encounter graspables in this way, and unless someone places things in their hands, they may not develop a mental representation of grasp. Though they may have the idea and the intent, many severe athetoid children simply cannot maintain grasp due to conflicting withdrawal reactions. With other children there is no motor excuse--hands are open, motor grasp occurs with grasping of hands or feet, but there is no grasp scheme for objects.

Early objectives for developing a grasp scheme for objects may be baselined and monitored by recording duration of grasp. If an object is placed in a tightly fisted hand, awareness or interest may be indicated by quieting, a tentative movement toward the mouth, visual or head orienting, etc. A strategy that has been useful with several children has involved tying a small bell or rattle in the child's palm with large colorful yarn for five minutes so that the object would not be immediately lost. During that five minutes we might record changes in the cumulative time fingers grasped and regrasped the object, or other awareness behaviors. Following the five minutes the tie would be loosened, and five or six trials timed for duration of maintenance of grasp. At the beginning of tied and untied trials, the teacher would squeeze the child's fingers around the object, guide to mouth or to gaze, shake a little, etc. As duration increased, commonly the tied trial could be eliminated.

The next steps would involve coordination of grasp with other schemes such as mouthing, looking, or listening, and at this point tying might again be needed for a time as grasp might be difficult to maintain with arm movement. A fading of assistance might be appropriate here until grasp could be maintained with arm movement. Side-lying positioning would be explored to see if this facilitated this coordination. Maintaining grasp with arm movement is a motor ability; the intent to coordinate schemes, however, may be clear even though the child drops the object, and that intent reflects a cognitive scheme. Work with the basic grasp scheme is planned in conjunction with other objectives under the subscale "Means for Achieving Environmental Events" and will be further discussed.

Sucking scheme. Evaluation and training of sucking abilities or problems will not be discussed in this paper, except for brief mention of work with suck in early operant learning (Bijou & Baer, 1965; Kalnins & Bruner, 1973) and in the development of use of the hand as a tool. Control of environmental events such as visual or auditory spectacles by sucking has not been utilized with severely handicapped infants as far as the author knows, and it may be impractical due to problems with this basic scheme. The role of sucking in the development of grasp begins with some automatic relationships, such as the palmo-mental reflex. Coordination of voluntary grasping and mouthing schemes plays a prominant role in early hand use, but we do not know that this is essential for development of the hand as a tool with handicapped children. We have seen many children who have developed hand use and object exploitation without coordination of hand and mouth schemes, not always attributable to motor impairments, and several now feed themselves. We need to explore relationships with other behaviors such as chewing or acceptance of textured foods, praxic oral abilities related to speech sounds, and others. The mouth is such an important explorer for most sensory handicapped children that the author is more comfortable with our other typical problem, the child who mouths too much!

Coordination of Basic Schemes

The initial items of the Sensorimotor Cognitive Assessment deal with coordination of basic schemes. Tracking 180°-arcs involves coordinating head turn with eye following in order to maintain perceptual contact with an object (Visual Pursuit, Localization, and Object Permanence subscale). The hand-watching behavior of the supine child involves moving an arm in order to obtain or continue perceptual contact with hand (Means for Achieving Environmental Events and Operational Causality subscales). Sound localizing in the Construction of Object Relationships in Space subscale involves coordination of head turn with auditory processing and results in visual and auditory correlation under normal circumstances. In the subscale for Schemes for Relating to Objects, in addition to coordination of grasp with mouthing, coordination of grasp with looking is a critical early behavior.

These coordinations of schemes may be very difficult for a motor-impaired child. Strong tonic reflex posturing or severe oculomotor problems may interfere with tracking in wide arcs or turning eyes and head to sounds. Due to exaggerated neck extension and abnormal quality of the asymmetric tonic neck reflex, the handicapped child's hand may never intersect with his/her gaze, whereas in the normal child this pattern allows or facilitates hand-watching. Even in side-lying positioning, neck extension and upward eye deviation, combined with extended arms, may prevent hand-watching.

Children with visual handicaps may demonstrate the hand-watching behavior, but at such a close focal distance that this localization does not progress in the normal sequence to directing reach. The child who cannot focus on near objects, including hands, seems particularly diverted from normal hand use development, and the blind child does not have this critical coordination at all.

Severely/profoundly handicapped children may demonstrate a variety of unique and personal behaviors which are at the level of this early coordination of schemes, and so do we all. These reflect a beginning level of "means-end" or causality behaviors; however, in these children they are maladaptive and do not lead to further development. Examples are self-stimulatory behaviors such as the head-rolling of a visually impaired child, or hand flapping or eye pushing. Such behaviors may fill a need for sensory input, especially self-regulated input, and careful analysis can tell us a great deal about functioning abilities and reinforcing stimuli.

General Suggestions for Administering the Sensorimotor Cognitive Assessment

Each of the subscales of the Sensorimotor Cognitive Assessment will be described separately with examples of curriculum at the lower levels. If it appears that the child manipulates objects at all, the Schemes for Relating to Objects subscale is a good starting point. When a child is interested in an object, problems can be presented across the other subscales. Intrinsic motivation is a critical factor in performance. When a child does not perform a task, it is suggested that the object be given again to the child to be sure s/he is still interested in it, and on occasion one may probe with an edible such as a cookie.

To credit the child with a certain level of performance on any of the scales, three examples with different materials or situations should be successful. If the child has learned to perform the task only with specific materials, this may represent a skill, but not the desired generalization which suggests a concept. Testing is continued in each of the subscales until two successive task levels are failed. When the child is failing a task, prompts or additional information can be given which will sustain interest and provide assistance in developing substeps.

It has been our experience that natural reinforcement of object and task interest are very important; thus, when the child searches for an object, the logical reinforcer is play with the object, and the examiner should not move too quickly to the next trial. Occasionally the examiner will need to use an edible reinforcer in addition to natural and social reinforcers to enable some children to demonstrate their best abilities. Reinforcement should often be given for task effort, not an arbitrary task level, as there is no really wrong response. Children will show unevenness and respond at one level with one object or condition, and at another level with a different object. The child with limited abilities can usually be assessed in one session; others may require two or three sessions.

I. Visual Pursuit, Localization, and the Permanence of Objects

This scale involves the development of the ability to represent objects and their location mentally--being able to think about them when they are not in the child's immediate perception. Recognition that the object still exists is demonstrated by search for the object. This representational ability is considered to be prerequisite to development of symbolic thought and language.

A. Advanced Visual Pursuit and Localization. Prerequisite behaviors for object permanence.

1. Follows a slowly moving object through a complete arc of 180°.

2. Child maintains gaze at point where object s/he was tracking has disappeared.

3. Child reaches for and picks up (may or may not touch cover) an object which was partially covered as s/he observed.

4. Child follows an object suspended from a string through a complete arc around his/her head and turns to side opposite its disappearance in anticipation of its re-emergence.

5. Child leans or moves in seat to look after an object which was dropped so that it falls out of the child's view. (The object should make very little sound.)

B. Object Permanence

1. Single visible displacement with one screen. Object is covered completely. Child removes screen and takes object. Do not credit if child merely removes screen and plays with it.

2. Visible displacement, random alternation between two screens. The child removes correct screen and obtains object.

3. Sequential visible displacement with two screens. The visible object is moved slowly, first under one screen and then is placed under the last screen.

4. Invisible displacement with one screen. Object is placed in examiner's hand, can, or box top, then released under the screen. Hand or box remain close. Child may check the last place s/he saw object first--the hand, box, etc.--but is credited if s/he continues search under the screen.

5. Invisible displacement with two screens. Searches directly under the correct screen.

6. Sequential invisible displacement with two screens. Child searches under screens, in order first to last, or directly under last.

7. Sequential invisible displacement with three screens. Child searches under screens, in order first to last, or directly last.

8. Representation of sequential invisible displacements. The object is hidden first in hand, can, or box, which is moved sequentially under the three screens; however, the object is released under the first screen. When the child does not find the object in searching under the last screen, s/he systematically checks back in reverse order. (This item is not administered unless child has progressed to search directly under last screen in No. 7.)

Adaptations for motor impairments. When the child is motor handicapped, s/he may respond with reach or point if possible, and the examiner can assist by lifting the cover. With those children who are unable to give a clear indication through pointing, an eye-point may be a more reliable response. This activity and strategy can be preparation for use of this indicator response with later language activites, such as indicating named objects or pictures or indicating wants presented as choices.

Children often will reach for objects before they understand or use referent pointing. Another strategy useful with very severely motor handicapped children when they do not yet use a systematic referent eye-point is to assist the child's arm and hand motions, waiting for a beginning movement that shows clear intent toward the covered object. Guiding should be done from behind to develop the best co-active working relationship between the child and adult.

The child's ability to maintain eye contact with the sequence of events is critical, and a child with an unsteady head or oculomotor control problems will have difficulties attending and will be apt to make errors on the basis of lost contact or directional eye movement problems. The child's chair adaptations need to provide conditions which provide for head stability and centering without any tilt backward of head on body. Because many children's oculomotor control will be more efficient in a centered forward gaze, rather than down gaze, raising the height of the task presentation will be helpful. This will also eliminate the dropping forward of the head that may occur with effort to look down at tray, and the child will maintain better head control. Whenever the child's head drops forward in effort to look down at tray, s/he not only may lose eye contact, but his/her eyes also may roll up both as a counter-rotation upward with the head drop and in an exaggerated roll up with head movement as the child lifts his/her head again. When such a child is ready to scan pictures, a tilted up rack is needed.

Close cooperation of therapist and teacher is needed in the design of adaptive chairs and other equipment. The external support conditions needed for attention and thinking will need to be more supporting than one might otherwise prescribe in a chair. For the sake of increasing motor control, one would like to allow the child some active control and challenge to right his/her own head if this is possible, and complete support all the time could inhibit motor progress. Obviously both conditions are important and need to be provided for in the plan for the day.

Adaptations for visual impairment. Different criterion behaviors are needed for the blind child. Early mental representation and anticipation will occur in other sensory modalities. For example, the child's facial expression may indicate beginnings of memory when the music box or tickle game is paused. Some blind children will orient or turn to sounds later and seem to maintain that orientation briefly when the sound stops. Anticipatory responses may be seen with a kissing game alternately to each cheek or auditory motor baby games.

When the sighted child first searches for visibly displaced objects, the object is associated with location. For the blind child memory of expected location is particularly important. The child who has learned to repeat movements to activate a sound spectacle will begin to reach for the location where the chimes were previously suspended. If s/he accidentally loses the object, s/he may begin some searching movements where s/he last found it, and we may see a beginning tactile sweep. If s/he encounters the object, s/he may recognize and regrasp it. This type of behavior is seen between 27-36 weeks in otherwise normal blind infants according to Fraiberg (1966, 1975). This is when the sighted child is typically beginning search with a complete visible displacement. Rather than visual memory the child is using tactile-kinesthetic memory. Whether reach at this level is for specific object in mind or where "something" should be is debatable.

Not until 37-48 weeks does sound begin to evoke the concept of the object, and we may then see a blind child reach to a sounded object if s/he has just played with it. Not only is the sound recognizable, but it evokes an idea of the object in terms of tactile-motor memory, derived from the child's experience acting on the object. At first this must be a familiar object. Fraiberg feels that reach to a sounded object which wasn't just played with by the child will not be seen before 49 weeks, and when this occurs the child will begin to move out into space to a sounded object, the beginning of orientation mobility using sound.

Reach to sounded object also depends on the developmental level of sound localization, also considered in the spatial subscale. (Northern & Downs, 1974; Bower, 1977). The location of the sounded object is important. Inability to reach to sounded object may be because the direction is not yet possible, rather than due to lack of object concept. If the object is presented where the child typically expects something to be when s/he plays with an adult, one may assume s/he has a representation for the object whereas s/he simple expects "something" to be there.

Commonly we will see a child reach near its ear in supine first, then on floor or on tray laterally and downward in sitting. Because sound localization involves an interpretation of the difference in timing of sound waves reaching each ear, it is important that location be well lateralized. When a sound is presented in the middle, the child cannot tell if it is front or back, though s/he will learn by experience that it's usually in the front, and eventually s/he may learn to turn his/her head to assist localization.

Eventually a blind child will reach where s/he heard a sound which was discontinued, and with trust and experience an older child reaches on very slight sound cues. I have seen a blind child remove obstacles over sounded objects, probably quite a high level of permanence. Fraiberg feels that the blind child does not complete development of object permanence until mobility around the house is established, and the child can search for mother or toy around the house--object existing independent of place.

The deaf-blind child with hearing in only one ear, or marked discrepancy between ears, has a real problem with sound localization. S/he will not be able to use environmental sounds in orientation; perhaps echo location using his/her own sounds is possible with change of head position.

I have seen a totally blind child with only one ear develop some localizing abilities within his/her own space after we worked on pairing sound with touch to body. I don't know how the child was doing this. In these instances inability to reach to sounded object may not mean lack of object permanence concepts. The sound may be recognizable and evoke imagery for the object. We might see persistent search with increasingly systematic tactile scanning, suggesting object concept where localization is difficult.

The partially sighted child often fools us into overestimating his/her visual learning ability. S/he may be able to track, maintain gaze at point of disappearance, and even search for visible displaced object with one or two screens--levels of which the object is closely associated with location. Then the child seems to be stuck and not progressing to the more complex search problems. Perhaps the child does not have the higher level visual imagery, possibly due to inadequate discrimination of the object, perhaps due to some inability to form visual imagery. In any case we may need to help the child acquire mental representation for the object, as must the blind child.

II. Means for Obtaining Desired Environmental Events (Means-Ends)

In this subscale we look at the child's use of one behavior pattern or scheme as a means to effect another end or goal. We see the child beginning to attempt to maintain or regain interesting environmental events and development of the hand as a tool in the early stages, and objects as tools in the later stages. Increasing intentionality or foresight are the essence of this subscale, and increasing differentiation of means and ends. This subscale with the Causality subscale, we believe, are closely related to the early development of communication as the child learns to use signals to indicate wants and to foresee their effect. The upper stages of this scale have been found to correlate highly with the emergence of one-word phrases (Snyder, 1976).

1. Hand-watching. Coordination of two schemes, moving arms to visually explore hand. Generally observed in supine position in infants.

2. Child repeats an early motor movement (batting, kicking, head motion, etc.) which activates a visual or auditory spectacle.

3. Child reaches and grasps toy when both hand and toy are in view.

4. Child reaches and grasps toy with just toy in view.

5. Child pulls a support (pillow, cloth, box top, etc.) to obtain toy which is just out of reach. (With or without demonstration. Record demonstration as prompt.)

6. Child uses some form of locomotion or movement between postures to obtain a toy out of reach.

7. When a toy is held above a support, the child does not pull the support as previously, but realizes s/he must reach or signal for the object. (This item is not administered unless the child passes No. 5 above.)

8. Child pulls string to obtain object on a horizontal surface. (With or without demonstration.)

9. Child uses string tied to object to obtain it while it is not in the direct line of sight, pulling string vertically usually. (With or without demonstration.)

10. Child uses an object within reach (stick, small rake, large spoon, etc.) to obtain object which is out of reach.

11. In the problem of putting a long necklace or string of beads into a tippy container such as paper cup or tall narrow container, the child foresees the likely fall of the container and adapts a successful approach from the start. Foresightful behavior might be bunching beads in hand, stabilizing cup with other hand, lowering beads carefully by string, etc.

12. Child does not attempt to stack a solid ring which is mixed in with other rings for post. This implies mental representation of the end and the means, and foresight rather than the hindsight after an unsuccessful attempt to put it on the post.

Development of reach as a means to grasp. Problems in the development of simple reach and grasp will involve cognitive factors, motor factors, and sensory factors, especially vision and hearing. The early hand-watching behavior and the grasp scheme are both important precursors. The very early sequence of events leading finally to reach as a means to grasp has been described by White and coworkers (White, Castle, & Held, 1964; White, Held, & Castle, 1967; White, 1969) and by Bruner (1969).

The beginnings of reach and grasp seem to be separate mental events, which are finally coordinated, a kind of sequencing forward. Experience with assessing and training a number of children who did not use their hands suggests that because discrepancies may exist between the two schemes, it is appropriate to design parallel curriculum sequences which finally merge, rather than arbitrarily sequencing grasp and reach events together.

In the normal course of events the child's interest in visual stimuli, increasing accommodative ability for different focal distances, hand-watching, and seeing hand by stimulus, lead to an approach movement to the visual stimulus, without any intent to act on the object.

This type of experience and the discovery that arm and leg movements may cause something hanging in the crib to move or sound may vary in sequence according to the child's visual

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abilities and environmental circumstances. Watson and Ramey (1972) and Watson (1977) have conducted research with normal infants.

Repeated encounters may lead to a mental association between hand and object, and the anticipation that develops evolves toward the reach that can be used for batting or later for grasping. In motor development we often see a similar sequence--experience in a new posture finally prepares for new righting abilities for independently assuming the posture. In the development of hand use, seeing or hearing or touching one's hand with stimulus prepares for intentionally placing hand by stimulus. Spatial location of arm placement also synchronizes with visual or auditory location.

Use of limb movements which produce an interesting auditory or visual event begins with an accidental encounter. With repeated accidental encounters the child begins to realize that his/her movements will maintain this interesting event. S/he may test this great discovery by pausing and looking, then show a flurry of action again as if to confirm this discovery. Eventually the child will show intention or foresight to initiate the movement when the object is seen, or sounded, or perhaps touched to his/her hand and withdrawn a little. We will record which cue seems to elicit the intentional movement. Often we see progress from touch withdrawal, to sound or ear-hand, and finally to visual cue if functional vision improves with our visually impaired children.

Any body movement may be utilized that is already in the child's repertoire; however, it is arm movement, evolving from a fisted batting or swiping to open-handed batting, that leads to reach and grasp. It is not unusual to see hands that have been fisted in flexor spasm begin to open, though extension in protective extension or propping are not yet present. In the course of discovery of him/herself as an actor on environment, a causer of interesting events, one will see intention genralized to other dangling "batters." A progression from the use of all limbs or both arms to the use of the limb producing the event also will occur, though slowly with the cerebral palsied child.

With the initial objective "Child systematically repeats movement which produces an auditory/visual event," the first step is to observe the child's spontaneous movements to determine the most probably movement and to define it in terms of part of limb, direction, and arc so that it can be counted. The second step is to record a baseline of three or five minutes of number of movements. The third step is to place an easily activated auditory/visual spectacle maker, such as brass or "fish-scale" wind-chimes, in contact with the limb so that the slightest movement activates it. We avoid tinkling the chimes except as a little prompt, when the child is not moving, aiming at guaranteeing a tinkle even for minimal movements. A yarn tie with slight tension may help harness slight movements and may increase awareness of the limb.

We often need to experiment with placement of the chimes until we get an optimal condition. We record the number of movements in three or five minutes, not just the successful ones in tinkling chimes, as we want a consistency with our baseline method. In early training it may be helpful to record baselines and contingent movements for each session, as changes are slow for some children, and others' performance will be variable from day to day due to seizures, arousal problems, etc. A less frequent sample may not catch the child on his good days.

One may need to experiment with different positioning arrangements. Experience has suggested that the child who does not use his/her hands will often move limbs more easily and deal with the visual and auditory spatial locations more successfully in the supine posture. This is where normal infants develop the basic concepts and motor patterns for hand use. Some control of abnormal extensor tone, which is often exaggerated in supine, is helpful--a pillow to flex head, and perhaps flexion of legs over a support or one's lap. The child's head should be allowed to turn a little toward the event, and the arms should be left in the horizontal plane to start--also where they are in the normal infant at this point. Stimulus presentation should be clearly lateral; the arms forward and midline coordination will come later if possible. Side-lying may be utilized also, if it is optimal for the number of movements, and counting and recording will determine usefulness. At this time these positioning interventions are suggested only for those children who are not using their hands; they have been tested through successful experience with this group. The author is not prepared to generalize these methods to the cerebral palsied child, who obviously tries to use his/her hands, without more data, because the author has used other principles in their management, as will many therapists.

As a therapist the author used to feel concern about the child's "use of abnormal patterns" and was concerned that an increase of tonic reflex activity might result from these activities in supine. Experience has caused a revision of these premises, and the author is now more concerned about the effects of never acting on environment, both on the child's cognitive development and motor development. As one sees the child develop intentionality, one sees the child break through its abnormal postural patterns, and with the development of reach and grasp, one can then work toward the more symmetrical movements. Of course the child should not be left too long in an asymmetric supine, or any posture, as that can contribute to deformities. We should be concerned with providing a variety of postures, with different advantages and disadvantages for each. Good positioning may also be deformity producing, and may be crippling for early sensory organization and cognitive development if the child cannot organize attention, sensory functions, and act effectively in that position .

As we see a systematic increase of movement and the development of more intention, goals can be set toward shaping movement more toward a truer extensor swat to the side. It is a good rule to practice with each arm, just as with grasp, and to stay with one arm and hand in a session at first. It is not unusual to have one hand be best at grasp and the opposite arm be best at directed reach and batting, which is often related to the child's tonic neck reflex pattern. In time the child will get it altogether, more typically with the best batter.

Once the teacher has determiend a workable combination, environmental arrangements can be utilized for some periods when direct attention must be given another child. It is important not to leave such an arrangement too long, however, as the child may become satiated and be unable to get away from the stimulus. It is also important to work for generalization and accommodation across other dangling objects or with 'tippy tinkle toys' such as a "Happy Apple" before considering this level proficient.

Hopefully the child has also been establishing a grasp scheme and has progressed to coordination of the grasp with mouthing, looking, or listening. Strategies for developing these further coordinations cannot be described in detail in this paper. A significant step then occurs in which the child sees or hears the object, bats at it intentionally, and then when contacting it seems to think of grasping, as if an afterthought. With our severely/profoundly handicapped children who are developing mental representation so slowly, this appears to be a major stage occurring before the child reaches with his/her hand shaped in readiness with intent to grasp. With these children the author has not really seen the slow approach with alternate glancing between hand and object which has been described in normal infants as Piagetian reach. With time the child will need to retrace some of these steps in sitting with objects on tray and in other positions.

Obviously the steps for a visually impaired child will be different and will depend more on sound localization. This includes the children whose hand-gazing is very close, and the hyperopic (farsighted) children who have no visual contact with hands or near objects. The development of direct reach to sound cue is delayed several months in the blind infant, depending on development of sound localizing in several directional gradients and on beginning concepts of object permanence. These sequences have been described in detail by Fraiberg (1966) (See Table 1.). The work on grasp scheme, coordination of grasp scheme with mouthing or listening schemes, and systematic repetition of movements causing an auditory spectacle will prepare for eventual reach to sound.

Objects out of reach. In our experience the order of the items for strategies for obtaining objects out of reach--pulling a

Table I

Sequence of Development of Directed Reach In Blind Infant According to Fraiberg

23-28 wks. Hand pantomimes action briefly when grasped object is withdrawn.
Object sounded, without previous manipulation, no response.
Object touched to fingers, hand explores and grasps.
Object sounded, after previous manipulation, no response.
Does not yet search tactilely where lost object.

At this stage sound doesn't confere substantiality to object, though infant discriminates mother's voice. Hearing and holding are separate events.

27-36 wks. Object touched to hand, beginning search.
Beginning random search in place expects object to be.
Accidental contact results in grasp, then shakes, etc.
Object sounded, after previous manipulation, hand seems to activate in grasp movement, but no search; however, head seems to orient to sound occasionally.
Repeats guided familiar banging object, kinesthetic memory.
Patty-cakes on verbal cue.
Stereognosis--recognizes cup manually and takes to mouth.

Interprets as sound not eliciting tactile-motor memory of object, but associates feel of object with shaking.

37-48 wks. Object sounded, after previous manipulation, occasionally able to reach to it.
Reaches where last had contact with object.
Object sounded, without previous manipulation, see grasp motion but no search.
Protests removal of object.
Examines tactually and reorients. Discriminates and shows preference.
When toy withdrawn, hand follows.

Attributes beginning of reach to sound as convergence of recognition of sound of familiar toy and tactile motor memory. Search coincides with examining scheme and object has qualities of its own.

49 wks. Reaches to sound cue alone.
Begins to move into space to sound and develops space map.

support, horizontal string, or locomotion--is somewhat variable depending on the motor abilities and experiences of the child. When great motor effort is involved in moving to object out of reach, well-established intentionality or ability to hold a thought through intervening events is needed. The author has just seen a child whose cognitive development is delayed even more than his motor development, who is just becoming able to turn from sitting to all-fours to creep. He seemed to demonstrate intent to obtain an object out of reach, but by the time he had completed his rotation maneuver, he had forgotten his goal. He had also momentarily lost sight of it in turning, and perhaps it no longer existed for him. One strategy might be to sound the object to attempt to hold his attention and intention. One might also design a shaping procedure, gradually requiring more of the motor sequence before giving the toy to the child. When the child's intention is strong it is an advantage in gross motor training, and should not be squelched by failure to provide for appropriate reinforcement.

Some children will need to learn that each new ability to change posture or locomote can be a means to obtain things out of reach. The teacher will need to observe carefully and try to decide if a child is moving for the fun of it and happening upon toys, or localizing and moving intentionally to the toy. For the blind child this will again be a sound localization problem, and movement into space will come slowly (Fraiberg, 1966; Fieber, 1974). The child may learn to pull a supporting object through accidential or guided pulling, then may realize that this is a means for obtaining the wanted object. The best strategy would be to first let the child play with the toy on a piece of cloth. Similarly, experience with string on object will be necessary before child will use the string as means. Use of a separate tool can be learned through guided movement. All of these will depend on some degree of object permanence for the blind child.

III. Development of Operational Causality

A child begins to understand causal principles when s/he begins to anticipate events. Through repeated sequential events s/he begins to think ahead. Causality behaviors are merged with "means-ends" behaviors in the early stages of acting to produce interesting sights or sounds. Then the child begins to generalize his/her repetitive actions to other circumstances where s/he really isn't the causal agent. S/he feels at first that s/he is the source or cause of events, but later begins to realize causality exists outside him/herself and attempts to act on the source of the interesting event. The child increasingly communicates with adults who can make things work for him/her, and finally learns through imitation to identify and activate the agent which makes mechanical toys work.

1. Hand-watching behavior. Momentary control over a source of input is made possible by coordination of two schemes.
2. Child repeats motor movement (batting, kicking, head motion, etc.) which activates a visual or auditory spectacle.
3. Examiner performs a spectacle such as swinging a toy, winding up music box, etc., and when it is paused the child uses a "procedure" to elicit the event again. This may be a batting motion, kicking, or vocalization, something he has previously used to activate things himself.
4. Child touches the object or examiner's hand when the examiner has demonstrated an activity with an interesting wind-up toy and then stopped it. The examiner's hand should be available in reach.
5. Child makes a mechanical toy perform its action manually. Examples are pushing the wind-up car, directly moving the arms and legs of the clown activated by pulling a ring-string, or turning the wheel of the wind-up musical ferris wheel.
6. Child hands toy back to examiner to activate it again. At this level the child is more clearly requesting the action. Some children may guide the examiner's hand to the toy.
7. Child lets the activity of a wind-up toy continue without intervention. This item should be credited only if the child has demonstrated the stage of directly activating the toy.
8. Child attempts to activate mechanical toy himself after demonstration.
9. Child attempts to activate the mechanical toy himself directly. Note: Success at final level implies completion of lower levels. Present a variety of mechanical toys, activating them first without the child seeing you wind, then with demonstration.

Procedures--Beginnings of communication. When an interesting spectacle or event caused by the examiner is paused, the child must be able to represent this event mentally at least briefly and to anticipate that his/her procedure may reinstitute it. When the child has not been demonstrating the signs of beginning mental representation and anticipation in the visual channel, other sensory modes should be explored. For example, one little girl the author works with has visual tracking and directed reach, but she does not show mental representation of visual events such as maintaining gaze at point of disappearance. She does not signal for more of a visual event. She seems to remember an auditory event such as wind-up music box, as indicated by a continuing expression of attending and smiling. She will hit at the music box when it stops, a "procedure" generalized from her scheme for hitting at chimes and "tippy tinkle toys." She also enjoys being swung in a blanket, and when this is paused shows similar attending and expectation, then either hits or kicks. She also enjoys a little game we have of tickling and making funny lip sounds that she makes, and when we pause will use this sound as a "procedure" for more of the game. Because our children have been reinforced for vocalizing, they will often use vocalizations as "procedures." It is important not to be arbitrary at this point about either the eliciting situations or the "procedure" the child chooses. At this level s/he may use different ones for different situations. Observation for any little action on the part of the child can be shaped toward a more systematic signal if one sees the signs of the child continuing to think about the event when it is paused.

Fussing is all too often used as a "procedure" by handicapped children, perhaps because they have not had other successful experiences in making things happen. Fussing has resulted in mother's attention, the winding-up of the mechanical swing or the mobile. For such a child one will need to work at the earlier level, helping the child to develop other ways of acting directly on the environment.

Mechanical toys. A child with severe motor handicap can learn to signal to others and to indicate understanding that a winder or lever is the causative agent for a toy by touching it or looking pointedly at it. It is desirable, however, for the child to have some success in directly activating things him/herself with minimal assistance. Toys which some motor handicapped children may be able to activate are: keyboard toys such as "Whistling Songbirds," "Bigmouth Singers," and "Melody Mike"; the "Pound-a-Round"; the "Surprise Box"; "Tomy Choo-choo"; and pull-ring talking toys with a larger ring attached. Toys which a visually impaired or deaf-blind child may think are perceptually interesting might be a Lite-Brite or flashlight, vibrator, etc. Guided motion will be necessary in demonstration and imitation.

IV. Construction of Object Relations in Space

This subscale includes several categories of spatial concept. We see the child beginning to recognize that objects differ in position in space and to relate them. S/he begins to understand the spatial orientation of an object for function. S/he can reconstruct trajectories of rapidly moving object, infers their spatial location, and begins to understand space coordinates related to his/her body surface. S/he experiments with the effects of gravity and expands his/her construction of space outside his/her immediate reach as s/he moves out into space and deals with obstacles. Because of the different categories of spatial concepts involved, the insertion of items for which the sequence is unclear, and the variable experiences of multihandicapped children, we find more inconsistencies in probing rather than stopping testing after two failures.

1. Alternate glancing rapidly between two visual targets. (Substep is slow alternate glancing.)
2. Child turns eyes and head and focuses on a sound source presented laterally and outside his/her visual field.
3. Grasps object directly when within reach.
4. Reconstructs trajectory of falling object and directs eyes to place where it must have come to rest.
5. Searches for a dropped object when the end of the trajectory is out of view.
6. Searches in direction of trajectory of object slowly moved behind him/her.
7. Child indicates recognition of reversal or different sides of an object by turning it to its "right" side.
8. Searches behind him/her for object moved rapidly behind.
9. Child brings two functionally related objects together producing physical contact at least three **times.** (Xylophone and stick, spoon and cup, drum and stick, etc.)
10. Child uses one object as a container for another. Several levels of container concepts may be demonstrated when the examiner places several objects in container, removes them both singly and "en masse" by dumping. Examiner notes whether child seriates several objects in and out one by one, or whether child imitatively reverses and dumps container.
11. Child builds tower of two or three blocks.
12. Child places toy on inclined plan and permits it to roll down the incline following demonstration.
13. Child moves entire body around a barrier and retrieves a visible object. The object should be moved so that the shortest distance to retrieving it is on the opposite side of the direction it moved.
14. Child moves around barrier to obtain object moved from visual field.
15. **Child places one nested cup inside another (series of four round cups) without demonstration.**

The final item of the Uzgiris-Hunt scale was not included in the current subscale in use in our program because of the frequent lack of mobility of our population. "Child indicates knowledge of usual whereabouts of familiar persons and recognizes their current absence. Representation of familiar space is implied by memory of usual locations of objects or persons it it." The child can be moved and helped to learn about familiar spaces at home and school and can be assisted to search for and find things. Understanding can be indicated by eye or hand pointing and gestures where possible. The blind child, if given the opportunity, will develop an internal space map of his/her familiar environment. The teacher can begin guidance of tracking of room peripheries and landmarks as soon as the child has some locomotion.

These spatial items are often found in developmental checklists used by educational programs under fine motor abilities. Here we are probing the child's understanding, not the fine motor abilities, and will assist the child motorically as necessary. For example, in the block stacking item the child may indicate understanding of vertical spatial relationships by trying to place one on another, but may be unable to control release. S/he may show beginning seriation as s/he sequences more without prompting. Although fine motor objectives such as accurate controlled release might also be included in a child's goals, his/her concepts do not need to wait for progress in motor proficiency that may never come. When one helps the child participate, one satisfies his/her urge "to do," and it is not difficult to tell the intent of the child's movements. Some interpreters of Piaget feel that sensorimotor cognition develops only through doing. We would modify this to learning through experience, not necessarily motor.

Alternate glancing. The ability to shift gaze between objects develops from two months on in the normal infant, beginning with horizontal shifts, and by four months also between far and near as vergent eye movements and accommodation mature. These abilities involve both development of higher central visual system functions and ability to regulate or shift one's attention. Some children we see remain at earlier levels of attention or diffuse distractibility, or at the next stage where the child is caught by stimuli and his/her attention often seems to be stuck. See Bruner (1969) for a discussion of the sequential organization of perceptual attention.

Work with shifting attention might initially involve presenting two interesting visual stimuli and using sound or movement cues initially to assist shift of gaze. In play with the child one can present two toys on the table and encourage the child to look at both, then to play with them alternately. When the child begins to hold two objects we may see further awareness of "two" as s/he alternatly looks, shakes, or begins to combine them.

Sound localization. The first localizing eye-turns to sound out of sight occur laterally at a close distance shortly after two months, and coordinated eyes with head turns occur by four months. Sound localization appears to develop in a predictable directional gradient (Northern & Downs, 1974). Not until nine or ten months does the child look directly to a lateral and downward sound source, and localization of sound out of reach is only beginning at that point. With the sensory and oculomotor problems typical of many multihandicapped children, they may never identify what is making a sound. This directional development is probably related to the development of directed reach in the blind child, or "ear-hand coordination." Reportedly many blind children do not turn to sounds but keep their faces frontally oriented. In our experience the turning response is often trainable in visually impaired children, and although there may not be visual identification, the eye-head movement seems to facilitate the development of "ear-hand coordination" and orientation in moving out into space.

In assessing and working with sound localization we first position the child with the head centered to reduce any tonic deviations of gaze, and start with the eyes in mid-position. It is necessary that movement of the object or your arm doesn't stimulate peripheral vision. The examiner can extend both arms as s/he faces the child to avoid cueing the child if help is not available. We present a variety of sounds of varying frequencies and loudness, including voices, and keep track of what was used. Often combined frequencies, especially voice, are more interesting than purer tones. Positioning in some flexion may reduce some startles, but noisemakers are avoided which seem to elicit them. We record if the child seems to respond or not respond selectively to certain noisemakers, or any tendency to asymmetry. At first one may want to record the latency, or how long it takes to elicit a response within a 15- or 20-second trial, and note the improved speed of processing. We also note whether an eye turn or eye-head turn was obtained. Because so many of the multi-handicapped children we see have possible central auditory system problems, poor responses do not necessarily mean receptive hearing problems; organization may improve. An audiological evaluation is indicated if responses do not change.

Teaching to the point of success is suggested when the child does not respond, teasing the stimulus in and out of the peripheral vision, guiding a head turn, or touching the side of the child's head to cue him/her. Touch cues to body parts can help the severely visually impaired child progress in other directions. The natural reinforcer for localization is seeing or being helped to manipulate the source. If the child cannot fix at the periphery, we move the object to a centered position. As we work with sound localization we should keep in mind the function--making visual meaning of sound sources as well as guiding orientation. When a child does not follow through with a visual fixation and identification, one can assume the child is going to have problems in making meaning of sound, and correlating information will need to be provided through other sensory modes.

Development of Imitation

V. Vocal Imitation

The beginnings of vocal imitation are heard in a child's spontaneous vocal play, and as the child hears these sounds and speech around repeatedly, they become recognizable as familiar. The first imitation of sounds must be based on sounds in the child's vocal play repertoire. Vocal imitative responses are best assessed during play or administration of other activities, taking advantage of communication and sharing with the child and spontaneous vocal play.

1. Spontaneous vocalizations occur other than distress sounds, implying some differentiation of the vocalizing scheme.
2. Child shows recognition of "own" sounds made by examiner by surprised facial expression, smile, etc.
3. Child repeats "own" sounds initiated by examiner (coo, ah, gah, etc.).
4. When examiner initiates child's familiar babbling sounds (baba, mama, dada, nana, etc.) the child responds with vocalizations, but not same sound.
5. Child repeats familiar babbling sounds initiated by examiner.
6. When examiner vocalizes novel sounds, not in child's repertoire, child vocalizes similar sounds by gradual approximations.
7. Child repeats novel sounds directly.
8. Child repeats simple new words.

In our population a substep before item 3 has been a major step. This involves the child's initiating the sound in vocal play, the examiner imitating the child's sounds, and the child's showing awareness and reciprocally repeating the sound. Many of our youngsters will repeat at this lower level before imitating an adult-initiated sound.

Because articulation problems due to dysarthria or apraxia may prevent a child from making certain sounds, evaluation by a speech pathologist is indicated if the child's sensorimotor level is nearing symbolic readiness but sounds are very limited. Alternative methods of communication may need to be considered. It is important not to emphasize vocal imitation at the expense of developing language meaning and reception through appropriate language input in meaningful activities. Language input may need to be in another mode, such as natural gesture, manual sign, or "touch communication," as utilized by teachers of deaf-blind children (Collins, 1974). With lower-functioning children prelinguistic forms of signals and referent behaviors which develop during the sensorimotor period should be established as working communication (Robbins, 1967, 1973).

VI. Motor (Gestural) Imitation

Motor imitation development follows a similar sequence, progressing from familiar movements to unfamiliar. This scale is particularly relevant if manual communication is being considered, and it will **affect** the learning of many other skills. This scale is often considerably delayed compared to other scales with our deaf-blind and other low-functioning children, and may imply some special problems with visualization.

1. Child demonstrates recognition of a familiar movement performed by examiner and may make some movement in response, but does not imitate the scheme.
2. Child imitates the familiar movement demonstrated by examiner.

3. - 5. Child imitates a familiar scheme in a new way or with new objects, i.e., hitting two blocks together. hitting keyboard toy instead of familiar **"Happy Apple."**
Level 3. Unsuccessful attempt at imitation.
Level 4. Imitates the action by gradual approximation.
Level 5. Imitates the action directly.

6. - 7. When the examiner demonstrates unfamiliar motor schemes or gestures to the child (verify unfamiliarity by asking parent), i.e., raising arms up high, scratching surface, "roll it" in pattycake, etc. These should be motions child can see him/herself perform.
Level 6. Child imitates several gestures by gradual approximation.
Level 7. Child imitates several gestures directly.

8. - 9. Demonstrate unfamiliar motor schemes which the child cannot see him/herself perform, i.e., opening and closing eyes, tongue movements to corners of mouth, wrinkle brow, etc.
Level 8. Imitates gesture by gradual approximation.
Level 9. Imitates gesture directly.

Before the child may imitate familiar movements demonstrated by the examiner, s/he may repeat when s/he has initated the movement and the examiner imitates child. Common familiar movements are hitting or knocking on table or tray surface, banging, shaking, etc. The early levels of motor imitation are more easily elicited around such familiar object schemes, which can be determined by administering the Object Scheme Assessment. It is not unusual to obtain responses at one level with one scheme, and at another level with another scheme.

When a child does not imitate demonstrated movements, we may check to see if s/he will repeat a guided movement, which is appropriate also for visually impaired children. In guiding hand and arm movement the adult should be sitting behind or beside the child so that the adult's arms point the same way as the child's. This decreases the likelihood of defensiveness and enables the child to establish correspondence between his/her movements and the adult's movements. This must also begin with sharing of something the child is enjoying doing. For example, child hits tray, teacher hits tray, and then teacher guides child in hitting briefly, verbalizing "hit, hit." One begins this gradually, and it cannot be done without trust and good communication with the child.

Sometimes a child will first repeat a guided movement, then come to recognize and imitate it visually. Some partially sighted children seem to be deficient in visual imagery processing and only imitate well-rehearsed movements. They may need to follow the guided movement route. The "co-active movements" derived from Van Dijk's work and utilized by teachers of deaf-blind children follow a similar sequence (Van Dijk, 1964; Fieber, 1975). Because so many of these children are deficient in object schemes, gross motor postures and locomotor patterns within a child's capabilities are often used in "co-active movement" sequences. It is important for the teacher to realize that moving together co-actively is not some magical exercise routine but an approach to be used in many shared experiences and activities of daily living.

Some of the profoundly retarded children who occupy themselves with self-stimulation such as intricate finger movements, have shown interesting responses when the examiner imitated their movements. Affective responses such as laughing or anger and beginning contact have occurred. A strategy utilized by Robbins (1973) is to share an activity such as rocking with the child to music, emphasizing "stop and go" with the music. Forward-backward rocking might then be modified to accommodate to a new situation, such as teacher and child sitting astride a large roll and rocking side-to-side. Imitation work is very much a social communication and is strengthened by a relationship with the child and the sharing of pleasurable experiences. When one touches base with the child's reality and shares it, the imitation play leads to beginnings of communication. Imitative play together is often the situation where one elicits spontaneous eye contacts and interpersonal smiles even in children who have been considered autistic.

VII. Development of Schemes for Relating to Objects

The child's spontaneous play with objects reveals the development of meaning of objects. The cognitive structures or meaning as shown by the child's actions with objects are called schemes. An object scheme assessment is included in the Sensorimotor Assessment (Figure 3). The schemes are divided into three classes--simple, complex, and social, which are roughly ordinal in sequence (Uzgiris, 1967). The following sequence of criterion behaviors has been described by Uzgiris and Hunt (1975).

1. Incidental use of object in the exercise of a scheme (mouthing).
2. Momentary attention to the object involved in the exercise of a scheme (visual inspection).
3. Systematic use of objects in the exercise of schemes (hitting schemes).

Figure 3

SCHEME ASSESSMENT

	Scheme	rattle	necklace	car	doll	doll shoe	rubber bands	bell	paper	cup
SIMPLE SCHEMES - INCORPORATES OBJECTS	1. holds object over 30 sec.									
	2. brings object to mouth									
	3. brings object before eyes or holds object & looks at it									
	4. holds object & looks around rm.									
	5. hits object with hands									
	6. hits object on surface									
	7. hits 2 objects together									
	8. holds and bangs on other palm									
	9. shakes or waves object									
	10. alternate transfer									
COMPLEX SCHEMES BASED ON PROPERTIES OF OBJECTS	11. examines object visually/manually									
	12. examines object manually or mouth									
	13. pushes object									
	14. rolls object									
	15. pats object gently									
	16. brings to ear									
	17. slides object									
	18. crumples object									
	19. stretches object out									
	20. attempts to tear									
	21. drops object systematically									
	22. throws object									
SOCIAL	23. shows object to another person									
	24. functional use of object									
	25. names object or related word									

4. Beginning differentiation of schemes as a result of interaction with different objects (shaking).
5. Shift of attention from the exercise of schemes to investigation of properties of objects (examining).
6. Selective application of schemes dependent on the properties of objects (differentiated complex schemes).
7. Acquisition of new schemes as a result of studying various properties of objects (dropping and throwing).
8. Representation of functional use of objects (beginning appreciation of social use, holds cup as if to drink, etc.).
9. Reference to objects in shared interaction (pointing, showing, sharing).
10. Verbal expression of recognition (naming or related word).

In assessing schemes the child is given a collection of objects such as those listed across the top of the scheme assessment form. Spontaneous behaviors with an object are recorded for an arbitrary amount of time such as two minutes. Each scheme demonstrated with the object is checked, and it is interesting to note the first and second schemes tried. The child is considered to have a certain scheme if it is observed with at least two different objects. Analysis according to the scale of criterion behaviors is then done.

The child who is mainly in the stage of simple object schemes does the same things with all objects, incorporating them into his actions. Meaning is in visual, auditory, or oral tactile sensations, so the child's sensory handicap will affect which are meaningful to him/her. With the opportunity to experience these simple schemes with many interesting objects, the schemes become internalized. The child tries out sequences such as shake-transfer-shake. S/he discovers an object is a poor shaker but an interesting banger, and indicates growing recognition for the toy and its properties by going directly to hitting on surface. This may be either a visual, oral, or manual recognition.

As the child learns that his/her repertoire of schemes are reinforceing according to variable properties of objects, s/he develops schemes of the complex class. The turning point is characterized by visual and manual examining behaviors, and sometimes by examining at the mouth. The child turns, pokes, and feels, and becomes more interested in properties of the object. S/he discovers and tries out many new schemes which are based on the properties of the objects, such as crumpling or stretching. S/he reaches that dreadful throwing stage, and systematically drops and picks up, and drops again. Until the child shows this complex class of schemes, s/he is not ready for container concepts or stacking. These behaviors can be taught operantly, of course, but may have no meaning for the child unless they are based on the necessary readiness.

The social schemes involve beginning representational behaviors. The child demonstrates functional use which has been socially learned, such as taking the cup to mouth as if thinking, "It's an object to drink with." The child's first functional use representations are self-directed. Then they become more social and communicative as the child gives the teacher, mom, or a doll a "drink." **Pointing and showing, giving and sharing behaviors increases** and the child may name the object or what it signifies, such as "milk" for cup. The child now has imagery and deferred imitation and is showing readiness for more formal symbol training in whatever language mode is appropriate (Bricker & Bricker, 1974; Robbins & Stenquist, 1967).

Children will show considerable overlap between stages or classes of schemes. The child who enjoys crumpling and tearing paper may still hit, shake, or mouth it. S/he may show functional use of the cup, then throw it.

With the very low functioning child the author personally feels that work in expanding object schemes is one of the most important areas of curriculum. One then begins to see a child play with objects, reduce self-stimulation, and to experience some of the events which lead to incidental learning in normal children. Activities are designed with objects based on the child's current schemes. The child's sensory abilities and interests are considered. For example, a number of children have been interested primarily in the visual characteristic of movement, and they quickly discard other objects. The author prefers to interpret this as what the child is able to perceive and not to assume that the child sees and perceives the object the same way the author does. For that child the author tries everything that has a tricky movement, such as a slinky collection of different colors. Another child may be interested in only in shiny, light-catching objects, and we will start with these.

Many interesting objects are introduced to the child's existing schemes and apparent perceptual interest, and as the scheme becomes stronger, we gradually require more accommodation. For example, if the child hits the chime, one might offer a "Happy Apple," chime, ball, **or balloon** with bells. We might then try to accommodate the scheme further to the "Roly-Poly Chimes" or a keyboard toy such as the "Whistling Songbirds." If the child likes flashlights or mirrors, we will introduce a variety of these, keeping in mind that perhaps that's all the child perceives visually.

The "same but different" novelty principle will provide general guidance. If the new action is too discrepant with the old, the child will not be able to accommodate his/her scheme and will lose interest. This principle also helps in sustaining attention. After the child has just played with a piece of crinkly florist paper, a piece of tissue paper, kleenex, or foil is "same but different," and the child will begin to explore.

The visually impaired child may have great difficulty reaching the stage of functional use representation because of limited perceptions in his/her experiences with the objects encountered in daily care. If visual discrimination or imagery for an object such as a cup is inadequate, the child, when given the cup, will exploit it by banging, shaking, rolling, dropping, but will not relate it to the experience of drinking. S/he must have been guided to hold the cup in the act of drinking if s/he is to show such a behavior. His/her imagery will need to be in the tactile-motor channels. Similarly, if s/he has been only on the receiving end of a washcloth, it will only be something to shake unless s/he has been guided to use it in washing. This is why in deaf-blind education we stress guiding or "putting the child through" the events of daily living just to provide a more complete perception of the event and a basis for motor imagery. This can be done in combination with fading techniques as feasible when we feel the child can begin to acquire self-help skills in the area.

After working with a number of children who are developing beginning object schemes, the author has revised her concepts of the importance of textures in very early object scheme development and is increasingly impressed with the role visual and auditory properties play, even with our deaf-blind children, who usually have residual in at least one modality. We do sometimes see early fingering, especially of self or mother as described by Frieberg in her studies of blind infants (1971), and sometimes we see manual object identification and selection of favorite toy. Often as the child moves into the complex class of schemes and realizes objects are good for different things, more acceptance or interest in texture emerges spontaneously. We really need research on the role of very early manual tactile functions and the kind of tactile input needed at different stages. Meanwhile, the author is proceeding more cautiously with her collection of "feelies", especially with avoidant children, and emphasize the meaning of the object or the feel. We may guide the child to feel his/her own body, or to feel mother's face, or teacher's face, and associate this with identification. We will be sure a "feelie" is classifiable in terms of actions if that is where the child is. As with any kind of sensory stimulation or bombardment, one is wise to let the child's reaction be the guide as to his/her ability to process the input.

Concluding Suggestions

Cognitive curriculum is most effective when it is applied across activities of a school day or daily life, as well as in structured session teaching. Creative teachers will find many opportunities in activities such as music, art, playground, or snack times, to carry out the individualized goals for children. We feel that when a teacher or parent can do this, learning becomes more interesting and generalization more certain. Although probes and measurements are more easily carried out during session teaching, recording can occur also throughout the day. Most activities are best recorded in terms of numbers of opportunity trials, rather than frequency per minute data. See Figures 4 and 5 for sample written objectives and probes.

Appropriate language and prelinguistic communication must be used and encouraged in all activities. If there is a discrepancy between sensorimotor cognitive and communication levels, careful thought should be given to level and mode of communication. When teaching the parents the parallel and self-talk verbal styles, we try to teach them to relate this or to gesture to what the child is interested in or thinking about at the moment. Frequently this is reinforcing in itself, and helps lead to the mental set that "things are represented by words, signs, touch cues, etc."

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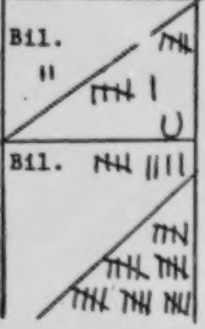
Figure 4

OBJECTIVE SHEET

CHILD'S NAME: C.M. TEACHER: N.F.

DATE	OBJECTIVE	PREREQUISTE SKILLS	DESCRIPTION OF ADMINISTRATION	BEHAVIOR RECORDED	LONG TERM OBJECTIVE	PROBE	DATE
1-17-74	Explore visual fixation to light spectacle.	Positive orienting r. (heart rate) to light slow Pupil r. light. Need to reduce deviation of gaze.	Centering cushion, supine posture Large light souce (covered flashlight or Lite Brite) 15 sec. trial.	Latency Time + - ? R, L, B 5 trials 1x week.	Unknown potential for functional vision. Visual Fixation 15 sec.	Count duration. Response other stimuli.	
1-17-74	Localizes sound by turning eyes to side within 15 sec.	Quiets to sounds. Mobility of eyes, reduce deviation.	Centering cushion, supine. Explore tilt up later. Vary sounds and voice. Few in, lateral and out of sight. Consecutive. 15 sec. trial.	Stimulus used Latency time. R or L + or - OP (Eyes only) OCP (Eyes and Head) 5 trials 1x week.	Localizes and visually identifies source of sound. Meaning for sounds.	Turns eyes and head to side.	
1-17-74	Moves arm to repeat sound spectacle.	Hearing. Limb Movement.	Position supine, pillow, slight head turn. 5 min. baseline 5 min. with tie from wrist to windchimes. Use gross extension movement. Try both arms.	No. extension movements during baseline and with contingent sound whether or not makes sound. R or L.	Batting and eventual reach.	Placement near hand, contact but no tie. Beginning look.	

Figure 5

		DATE	RESPONSE	DATE	RESPONSE	DATE	RESPONSE	DATE	RESPONSE	DATE
Vis. Fix.	4/5 trials 2 wk.	1-17	Lite - Brite 1. ? 14 B 2. ? 10 R 3. ? 7 B 4. ? 9 B 5. -	1-23 Much more definite	Lite - Brite 1. +5 R 1sec. 2. +5 B<1sec. 3. +4 B<1sec. 4. +6 R<1sec. 5. +5. B 1sec.	1-30	Goal: Latency 4 Duration1-3 1. +5 R<1sec. 2. +4 R 1 sec 3. +3 B 2sec. 4. +5 B 1sec. 5. +6 B<1sec.		Begin using probe sheet for careful analysis.	
Sound Loc.	4/5 R & L 2 weeks.	1-17	Rt. side 1. - rattle 2. - squeaker 3. +13 voice oc 4. +11 oc. voice 5. +14 oc - bell	1-23	Rt. side 1. - rattle 2. - rattle 3. + 10 oc. voice 4. +8 oc.bell 5. - music b.	1-23	Rt. side 1. +8 oc. voice 2. +6 oc. voice 3. - rattle 4. - rattle 5. +9 bell		Probe a more upright position ?Hearing	
			Lt. side 1. +4 oc. rattle 2. + 12 oc. squeak 3. +10 oc. voice 4.- 5. + 5 oc voice		Lt. side 1. +5 oc. voice. 2.- squeaker 3. +4 oc. bell 4. - 5. +5 bell		Lt. side 1. +5 oc bell 2. +4 oc voice 3. +4 oc voice 4. +6 oc rattle 5. +5 oc bell			
1-17-74	Increased frequency and prompt systematic movements.	1-17 Basal 5 min with 5 min	 Bil. Bil.							

COMMUNICATION

PRELANGUAGE DEVELOPMENT: COMMUNICATION TRAINING FOR THE DEAF-BLIND

Raymond Condon

There is a considerable gap between theoretical descriptions of language development and the application of concrete techniques to promote that development in the deaf-blind multihandicapped child. Many of the behaviors and processes described (or constructed) in language acquisition models either appear rarely or not at all in the deaf-blind child. But since there is not a theory of "deaf-blind language development," educators must develop techniques adapted from theories of normal development. Many of these theories describe a stage or period preceding formal language where prerequisite or crucial behaviors and/or processes (depending on the theory) develop. This period occurring in normal infants from birth to the onset of formal language is marked by the development of language-like behavior, a prelanguage system or, as it is most commonly called, communication. Although there is a variety of definitions of communication and formal language, in this paper "communication" will refer to the transfer of information (thoughts, feelings, and wants) from one person to another by means of some perceptually apparent event. In contrast, formal language is the intentional transfer of information from one person to another by means or an arbitrary but shared system of symbols with semantic and syntactic rules.

The fact that many deaf-blind children have great difficulty in acquiring formal language (oral, manual, or graphic) has led to a closer examination of what actually happens in the communication stage. Since communication precedes formal language, it is assumed that many of the skills and abilities necessary for language are based in the communication stage. The development of communication, therefore, has become the intermediate or, in some cases, the ultimate goal for the deaf-blind multiply handicapped child.

Designing an effective communication program involves four steps: the assessment of communication ability, the selection of the appropriate level in the communication hierarchy, the use of strategies and activities to facilitate acquisition, and the evaluation of the child's progress as well as the effectiveness of the entire program.

The assessment portion of a communication program is an attempt to determine the abilities of the child in cognition, object usage, imitation, social interaction (bonding and attachment), and in sensory functioning, as well as determining the interests and prior experience of the child. Information in each of these areas serves as a foundation enabling a teacher to structure strategies and activities.

Frequently used developmental scales and checklists for assessing cognition in deaf-blind multihandicapped children are the Meyers Children's Rehabilitation Institute's Adaptation of the Uzgiris-Hunt Ordinal Scales of Psychological Development, the Midwest Regional Center's Manual for the Assessment of a "Deaf-Blind" Multiply-Handicapped Child, and the Callier-Azusa Scale. The latter two scales also include sequences in other areas of development.

Assessing cognition is a difficult task due to the question of what are the components of cognition. There is even disagreement about which cognitive components are necessary for the acquisition of language. The cognitive abilities which appear to influence communication and language development strongly are the focusing and sustaining of attention to a stimulus, the speed with which simple contingent tasks can be learned (learning rate), the ability to make associations (causality relationships), and the use of means to achieve environmental ends.

There is no standardized manner to measure how well a child can focus and sustain attention or what his/her learning rate is. Teacher observation is crucial in these areas because the duration and types of activities will be determined by attention ability. Establishing a crude learning rate (child requires X trials to accomplish tasks A, B, etc.) will be used in the evaluation step to compare the results of the various communication activities. Of course, the difficulty and the motivation to perform the learning rate and communication activities will affect the results. But even if the teacher begins to quantify the child's learning performance on easy and hard tasks, there will be some means to evaluate these two factors in the communication activities.

All of these cognitive components which have been mentioned indicate the level of outward directed behavior and the flexibility or quickness of the child to take in new information. The inadequacies in these two is reflected in the pronounced tendency of the deaf-blind child to engage in self-stimulatory or inward directed behavior (flicking, rocking, and other perseverative behaviors). In order for the child to become a successful communicator, the degree of self-stimulation must not interfere during interactions. So a secondary goal of communication activities is to reduce the amount of self-stimulation by making the content of the activity more motivating and useful to the child--producing a gradual replacement of outward directed behavior for inward behavior. This is a slow and tedious process.

In Piagetian cognitive theory, object concept and deferred imitation (representational play) are major achievements during the period preceding formal language. There are many people currently stressing object permanence tasks as the facilitating technique to encourage symbolicness. It is dangerous to equate the child's performance on object concept (permanence) tasks with degree of symbolicness after these tasks have been systmatically taught. Piaget used the performance on this "retrieving objects under pillows" hierarchy as merely a reflection of, rather than the essence of, symbolic thought. The teacher can only encourage or facilitate this development by providing a multitude of activities which require the child to "keep in mind" objects, people, and actions which are not immediately perceptually present.

The function and subsequent teaching of imitation is equally controversial. In many theorists' opinions, imitation plays a crucial role in the development of language by enabling the child to copy language patterns and use them. These comprehension-imitation-production (or imitation-comprehension-production) theories place a high importance on teaching imitation as a language facilitating technique.

For other theorists imitation has more significance as a cognitive ability. In order to imitate, a child must attend to a model, discriminate the action(s) of the model, store these actions which have been perceived, and then reproduce them. Obviously, the demands of that task do require abilities which can be classified as cognitive.

A third viewpoint attributes a more social function to imitation. Imitation is a form of play, interacting with other people and objects and even with the child itself. There is a dual nature of imitation, cognitive and social. Teaching the cognitive part of imitation without its social purpose weakens the potential power of imitation as language-facilitating process. Assessment of imitation must address both the technical "how to" as well as the "why" of its use.

Social interaction, the ability to form an attachment with another person and then progress to an eventual reciprocal relationship, is perhaps the crucial prerequisite for the development of communication and language. Teachers must list the types of interactive behavior the child engages in, with what people, and under what circumstances (for a basic need, to play, etc.).

Another important area to assess is the object usage. Frequently included under cognition, object usage are the patterns of handling and interacting with objects. Objects, their uses, and people literally become the topics of communication. The development of object schemes facilitates attention, causality, object permanence, means-end, visual pursuit, as well as social interaction. Helping the child develop patterns of object usage is more appropriate than much of the traditional seat work activities used to teach concepts. Nancy Fieber and Cordelia Robinson of Meyers Children's Rehabilitation Institute have emphasized the importance of object schemes as a teaching approach with deaf-blind children.

The final major focus of the assessment process is directed to the sensory functioning of the child. Severe sensory impairments interfere with all phases of growth and development. Determining which sensory channel gives the child the most input will influence the entire educational program. Not only must the teacher select the preferred sensory input, but also the quality of that input (the sensory acuity) must be measured. The selection of a mode of communication--aural, visual, or tactual--depends on the accuracy of the sensory assessment.

As assessment information is gathered, decisions must be made not only on the mode but on the level of communication. The type of communication used must be appropriate in terms of the child's cognitive and social development. The teacher must use a communication system which the child can understand. Also, provisions must be made to help the child develop an expressive component.

The most basic type of communication behavior is the signal. These signals can take a variety of forms, but they usually have the characteristics of being few in number, carrying basic simple information concerning primary needs, and immediately preceding the referent--an automatic association between signal and event. This type of communication is environmentally encouraged--conditioned. These forms are not perceived or used as an intentional transfer of information by the child. The social component of the communication is secondary to the content of the input or output. The emergence of signals is evidence that a child is beginning to perceive patterns, an order of events in his/her world. The preceding event or stimulus becomes a cue to the child that the consequent event is about to happen. Gradually, these signals become a means of information exchange passed between child and environment (adult).

As this exchange of information becomes more solidified, another level of communication emerges. Gestures become the means of intentionally exchanging information. The characteristics of this level are a separation between gesture and result, increasing awareness of the role of the other participant in the exchange, the increase in the number of gestures, the creation of gestures by the child (idrosyncratic), and the observance of the rules of discourse, the protocol of reciprocal exchange.

Appendices A and B list a suggested hierarchy from signals to gestures to formal language. Since the same behavior can be either a signal or a gesture in many cases, particularly if manipulated signs have been introduced, the characteristic of the communication determines what level it is.

After the selection of the communication level, the actual implementation involves an overall communication system and special techniques and activities which are used during communication training sessions. The idea of language training sessions can connote automated, dull, and rote learning. With a little ingenuity and flexibility, a teacher can design these sessions in a natural setting. The big advantage of these sessions is that the environment can be more focused and controlled. The intensity of a language interaction is greater during a set activity, and it is more manageable to document and evaluate child performance. Initial activities become the baseline and with the use of videotape can become a permanent record of what was attempted, as well as how the child did.

These sessions can be divided into four types of activities: selection, power, object, and person interaction games. All of them should be done in a play format, a motivating climate. What specifically is motivating to a particular child will vary, but attention getting stimuli generally are novel and complex in relation to the child's cognitive level or are unanticipated and puzzling or conflicting. Unfortunately, the cognitive level of the deaf-blind child is frequently overestimated, and experiences which are too novel are presented. For some severely handicapped children, side-to-side rocking may be too much of a change from back-and-forth rocking. Hopefully, the teacher has accumulated enough information on the child's interests and prior experiences to structure activities which coincide with what the child finds motivating.

The first of the four types of activities, selection games, encourage expressive behavior on the part of the child. By offering the child two choices either between objects, action, or people, the teacher can assess what type of response the child can make, demand a specific type of response, or just give the child the opportunity to choose.

Power games have a similar purpose because the child is given the opportunity to use well-known behaviors. Repetition of tasks the child can do well and enjoys builds a sense of power over the environment. Variations of these games involve the adult's doing actions contingent on a child's response. By changing the contingent behavior--tickling the child--patterned rituals can be avoided. Although it is more difficult, especially with low-functioning children, reversing the pattern, with the adult receiving some action from the child, encourages exchange and reciprocity.

The third type of game involves the teaching of object schemes. There are two ways to develop more interaction with objects: increasing the number of objects used in a particular way or increasing the number of ways to use objects. Functional use, as well as manipulating actions or exploration, can be attempted. The secret to successful activities in this area is to gradually modify the types of actions and objects from those the child already exhibits a preference for. Eventually the ways a child manipulates an object may become a signal or gesture for that object or event.

Finally, interaction games with people help establish the social bonding, exchange, and reciprocity which is so vital to communication. Using a similar format to the power games gives the child practice at action-reaction circular patterns. One goal of this and all these activities is to have an enjoyable experience which realistically cannot always be achieved. But the other goals of increasing anticipation of external order; acceptance to changing patterns, new objects and schemes; and allowing the child to have control over events will facilitate communication. These activities should be considered as primitive dialogues. Too often adults working with children become the satisfiers of one type of need and fall into the pattern of interacting with the child in very rigid situations, i.e., giving commands, doing seat work. The child needs experience with a variety of communication topics, as well as the opportunity to receive and send information.

Daily living skills and motor and classroom routines can also be seen as communication activities. The routine imposes a structure and order on information (experience) and allows the child to transfer past information (experience) to the present by anticipating the next step in a sequence. But routines can become too rigid and can inhibit flexibility. Since they are frequently designed to teach goals other than communication, there may be a conflict between objectives. Exclusively using routines only gives the child experience in the temporal contiguity between events. This can develop into what Piaget calls "magicophenomenist" causality, and perception of a preceding event in a sequence is the cause. Other types of causality such as physical cause-effect and instrumentality (tool use) are needed to complement temporal routines.

A third general area of activities are those which are specifically designed to develop higher functioning of visual, auditory, and tactual senses. The more sensory channels receiving information, the greater the confirmation of communication. But while this training is under way, valuable time cannot be wasted waiting for a particular sense to increase its functioning. A common alternative is to combine either auditory and/or vision with the tactual sense. Even children who appear to have usable sight or hearing may need additional input.

Tactual pairing can be done by using contact communication, a set of taps or movements performed on the child's body by the adult (i.e., patting the bottom for "sit down"), after a visual or auditory signal or gesture is given. Others choose to manipulate the child's hands into the form of signs. At the lower end of communication this sign system is really a signal system and should not be confused with formal expressive language. Too often children are encouraged to use a system of communication which is too high. Children who will go through a repertoire of "signs" one after another to get something exhibit the problem of an inappropriate level of communication. The child has perceived some type of temporal association but has not developed a meaning association between a particular symbol or signal and the referent. In cases like these it is more advisable to design a system which the child can use (i.e., getting concrete objects associated with the activity).

In addition to activities and sense training, a teacher can use certain techniques to develop particular types of responses.

Waiting for a response, the use of the pause, is a simple but effective technique. A decision should be made regarding how complete the response should be. A partial movement in reach, or a partial signal or gesture can be systematically encouraged until the behavior is at a consistent level.

Then another technique, shaping, can be employed to mold the response to the form the teacher has selected. Encouraging the use of a point for a high-level communicator can produce a powerful and useful means of transferring information. The teacher should always encourage the child to respond to a higher level of communication than the one s/he currently has.

Sometimes prompting an appropriate response or action can be accomplished by eliminating all possibilities except the correct one. After pointing to the door, the teacher blocks all paths but the one out the door.

Since much information is carried by the hands, face, and voice, the teacher should encourage the child to focus attention on these areas. Special activities like tickle games, painting the face and hands, wearing gloves, and blowing on the child's face can be used either alone or preferably as part of other activities. Teachers should be as emphatic and obvious in expression, gesture, and intonation as possible even when there is doubt about what the child is receiving. Every chance to reach the child should be used.

During the implementation of activities and specific strategies, the final part of the communication program, the evaluation, begins. Feedback on the child's responses is needed to measure the effectiveness of the activities selected. Evaluation can be in the form of videotape, or written in lists or communication sampler of "dialogues."

When evaluating a communication program, the factors of quality (appropriate mode), quantity (specific situations in addition to during the normal day), and the level of communication should be considered. The selection of appropriate objects, events, and people should come from the child as recorded in the evaluation measures. The factor of motivation is just as important as the other factors in determining an effective program. Even though adults may wish the child to respond to "toilet," "stand," or "dress," the child may find "flick toy," "light," and "bottle" more interesting.

Ultimately, the effectiveness of a program is judged by results. If something works, then it should be used. The state of our knowledge in working with the severely handicapped, deaf-blind is not so developed that any one theory has a clear superiority over the others. Teachers must be willing to investigate for themselves this important area of communication and language development.

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Appendix A

Communication Hierarchy

Preling Responses
(Unintentional)

1. Whole Body Movements (physical manipulation) (reflexes, smiles, cry)
2. Body Position Cues (object cues)
3. Contact/Tactile Cues (contact communication)
4. Manipulated Gestures (with or without objects)
5. Getting Object or Associated Object (can be intentional)

(Intentional)

1. Reaching without look, pause
2. Pushing without look, pause
3. Pulling without look, pause
4. Showing holding object to adult
5. Pointing ("visual" point)
6. Personal Gestures (no object) (natural gestures)
7. Universal Gestures (cultural)
8. Pantomine

Appendix B

Output	Input
I. Signals:	I. Signals (cues, conditioned responses):
Smiles - expressions of feelings	Physical Manipulation
Reflexes	Contact
Oral, Visual Manual Events	Aural Cues (Sounds)
	Objects
II. Gestures - push, pull (signal & gesture):	II. Gestures - (nonlinguistic) push, pull (signal & gesture):
Social Smile	Manipulation Gestures
Points Reach	Showing Objects, Pictures
Personal Natural Gestures	Pointing--Reach of Visual Gaze
Objects, Pictures	Personal, Natural Gestures
Universal Gestures	Pantomine
Pantomine	Universal Gestures
	Intonated Utterances
III. Formal Language:	III. Formal Language:
Speech, Sign, Graphics	Speech, Sign, Graphics

COMMUNICATION DEVELOPMENT

Susan F. Soltman

Communication Assessment Procedures

Introduction

Assessing the communication skills of a severely/profoundly handicapped individual may be a difficult task. However, it is an important step in the systematic instructional process. There are two reasons why assessment is important: First, communication assessment assists in determining the present level of developmental functioning and, more importantly, provides information for individual program planning.

At the Experimental Education Unit adjoining the Child Development and Mental Retardation Center located on the University of Washington campus, professionals work together on an interdisciplinary educational team. The Interdisciplinary Educational Team consists of a teacher, parent, communication disorders specialist (C.D.S.), administrator, occupational therapist, clinical nurse specialist, and family liaison coordinator. Each team member is involved in the assessment process of a new pupil. Often, team members will work together to get the most accurate assessment information. After the assessment information is completed, the Interdisciplinary Team meets together to design and develop long and short term objectives for each pupil.

Assessment Procedures

When a new pupil is enrolled at the Experimental Education Unit, four types of communication assessment procedures are considered, depending upon their appropriateness for the pupil. Appropriateness is determined by his/her ability to attend to and follow simple directions. The four assessment procedures are: (1) parent/caretaker interview; (2) systematic observation and recording; (3) informal multiple trial assessment; and (4) formal testing.

Parent/Caretaker Interview

One assessment procedure that is used with all pupils is the Communication Assessment-Parent Interview. Although the parent/caretaker subjectively provides the communication data, a communication disorders specialist or teacher may conduct the interview. Besides providing information regarding previous intervention procedures, the Communication Assessment-Parent

Interview provides necessary assessment information in three additional areas. First, it asks how the pupil is currently communicating with others in the home environment, specifying verbal and non-verbal behaviors. This information is necessary to build upon existing communication behaviors already within the pupil's behavioral repertoire. Second, the form asks for information regarding potential reinforcers. For example, the toys the pupil likes to play with, foods generally eaten, or activities the pupil gets involved in are included as potential reinforcers. This information may be helpful in establishing new behaviors. Hopefully, if the pupil is communicating for something s/he likes, s/he will learn that communication can have an effect upon the environment. And third, the form provides information from the parent/caretaker regarding communication skills they would like the pupil to have. This information is important for establishing communication programs in the home as it is more likely that a parent or caretaker will run a program or encourage communication skills when they have a vested interest in determining the skills to be taught.

Systematic Observation and Recording

A second assessment procedure that is used for all pupils is systematic observation and recording (Soltman & Rieke, 1976). This assessment is completed by a trained communication disorders specialist. During this procedure the pupil is observed for 10 to 20 minutes over several days, during several activity periods. During this assessment all initiating communication behaviors and responding communication behaviors are recorded, including events prior to and following the actual behavior. Also, particular attention is given to any interactions between the classroom staff or peers and the pupil being assessed. Any conditions or events that promote communicating behaviors are of extreme importance. Subtle changes in body posture or in facial expressions may be the pupil's main mode of communication. With the severely physically handicapped, limited in verbal expressive communication, the observer should pay particular attention to voluntary responses. Voluntary responses are any responses that the pupil has control over and which can then be used as the responding mode in an alternative communication system. With some pupils who have difficulty responding to formal testing this may prove to be the most important assessment information.

Once the assessment information is compiled, it needs to be sorted according to the following categories:

1. Types of communicative interactions or antecedent events producing the most communicative responses.

2. Types of communicative interactions producing the highest developmental response.

3. Types of communication behaviors used most frequently, i.e., verbal or nonverbal.

4. Percentage of the time the child responded to communications from others.

The parent/caretaker interview and systematic observation and recording provide data on potential reinforcers, level of developmental functioning, communication behaviors used in the home and classroom environment, and some priorities for programming. This information should provide a basis to begin instructional communication programming.

Informal Multiple Trial Assessment

A third assessment procedure used with some pupils is the informal multiple trial assessment procedure. Communication Assessment for the Non-Verbal Pupil is an assessment tool developed for this procedure (Soltman, 1976). This assessment procedure is appropriate for individuals who are frequently untestable in formal testing situations or who display inconsistent communication behaviors. Communication Assessment for the Non-Verbal Pupil measures communication behaviors in the severely handicapped pupil functioning between the ages of 4-24 months. This assessment can be completed by the classroom teacher during a normal day. Because the tool allows for multiple trials on any test item, testing can be discontinued whenever the pupil shows signs of not attending or not complying.

Test items are administered when they would naturally occur in the environment. For example, one test item may assess the pupil's response to come to the teacher when instructed to do so. It would be appropriate for the teacher to require the pupil to come when s/he wants the pupil to participate in a program rather than setting up an artificial situation asking the pupil to come ten times in a row with no natural consequences being administered. All responses attempted by the pupil are socially reinforced.

The pupil's ability to understand spoken language is assessed at three levels. The highest level assesses the pupil's ability to respond to verbal directions or greetings. For example, the teacher may simply say, "Come here" and wait for an appropriate response. The second level adds gestural cues to verbal directions or greetings. Here, the teacher may say, "Come here," and motion with her hands, then wait for an appropriate response. The third level, or learning probe, includes verbal directions with physical assists. At this level the teacher may say, "Come here," and physically assist the pupil immediately following any appropriate attending response. Because Level III is a learning probe, verbal directions plus physical assists are given five times in a row. After the fifth trial, the pupil is given the same directions at Level II (verbal directions and gestural cues) to probe the pupil's ability to retain a new response without physical cues from the teacher.

With all pupils, assessment should begin at the highest level. All items not passed with 80 percent proficiency should be assessed at the next level. The informal multiple trial assessment requires each item be administered five times. Ten trials are administered only if the pupil's performance is inconsistent during the first five trials, i.e., if three of the first five trials are missed.

Once the assessment is completed, it is necessary that the communication disorders specialist work with the teacher to determine where to start individual programming. All correct responses are tallied and the percentage correct is computed. This will give over-all information on whether the pupil responds better to verbal directions, verbal directions plus gestural cues, or needs verbal directions plus physical assists. If the pupil responds best to verbal directions plus gestural cues, it may be desirable to introduce a program that gradually fades out gestural cues so s/he learns to respond to verbal cues alone. Or, if the pupil is responding to a verbal direction with 40 percent proficiency, it may be desirable to begin a program to increase the consistency of this response. With some pupils who respond best to verbal plus gestural cues and also express themselves via gestures, it may be desirable to use an alternate communication system such as total communication (signed English plus verbal).

Formal Testing

Formal testing procedures are appropriate for the pupil who has attending behaviors and follows directions. There are many assessment tools commercially available for this purpose. Two tools that are easily adaptive and useful for the severely physically handicapped individual with no expressive language are the Assessment of Children's Language Comprehension (Foster, Gidden, Start, 1973) and the Peabody Picture Vocabulary Test (Dunn, 1975). Both tools allow pupils to respond in a variety of ways, such as pointing or signaling a yes/no response with the eyes while the examiner points to pictures.

Another formal testing device that may be used is the Language Assessment Aid for the Classroom Teacher (Shafto and Soltman, 1976). This assessment tool can be administered by a communication disorders specialist or a teacher with certain portions (grammatical structures and articulation) being assessed by a communication disorders specialist. The items for this test were selected from the Sequenced Inventory of Communication Development (SICD) (Hedrick, Prather, Tobin, 1975) on the basis of their relevance to a classroom teacher. Items assess pupils from four months to four-and-one-half-year developmental level and are thought to be sequential in nature.

There are three sections to the tool. One section assesses receptive language, one section assesses expressive language which can be elicited in a testing situation, and the other section looks at expressive behaviors that a pupil spontaneously initiates in the classroom. Each of these sections are self-contained in an individual booklet. After each test item, there are spaces provided to code correct and incorrect responses. This format can be useful to show pupil progress in language over a year or to plot an entire class' pass/fail performance on different language items. Correct and incorrect responses can also be coded on the Individual Pupil Profile which comes with the tool. The Individual Pupil Profile presents information on one sheet under three separate headings--receptive language, expressive language to be tested, and observation of expressive language. Items passed by an individual pupil are colored with a felt tip marker; those not passed are left in their original print. During subsequent testing, passed items can be colored with a different pen to give a pictorial representation of skills gained over the year.

Summary

Four assessment procedures--parent/caretaker interview, systematic observation and recording, informal multiple trial assessement, and formal testing--are potentially useful in assessing the communication skills of severely handicapped pupils. As certain procedures are not appropriate for all pupils, combinations of procedures may be helpful in determining level of functioning and deciding what to teach. Ultimately, the goals of the interdisciplinary educational team in general, and the communication disorders specialist in particular, is to provide needed assessment to paraprofessionals and professionals developing individual instruction for severely handicapped pupils.

COMMUNICATION ASSESSMENT PROCEDURES WITH THE SEVERELY/PROFOUNDLY HANDICAPPED

Assessment	*When Appropriate*	*Who Can Assess*
1. Communication Assessment: Parent Interview	a. all pupils	a. CDS b. Teacher
2. Systematic Observation and Recording	a. Pupil has few, if any, communication skills	a. CDS
	b. Remaining pupils (to record pupil's communication abilities in natural environment of school)	
3. Informal Multiple Trial Assessment	a. Pupil is difficult to test in a formal testing situation	a. Teacher
	b. Pupil is inconsistent in responding	b. CDS
4. Formal Testing	a. Pupil has attending behaviors	a. Teacher
	b. Pupil can follow directions	b. CDS

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COMMUNICATION ASSESSMENT-PARENT INTERVIEW

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Pupil: ____________ Date: ____________

b.d.: ____________ c.a.: ____________

Information: __________ EEU Placement: _____

A. Past Evaluation/Intervention Information

1. Has your child ever had a speech/language/hearing evaluation?

   Where:
   Who:

   When:

   What were the results/recommendations?

2. Has your child ever had speech/language therapy?

   Where:

   Who:

   When:

   What changes did you see?

   Did you work on therapy goals at home?

   What changes did you see?

B. What Does the Child Do To Make His/Her Needs Known?

I. Receptive Communication

	Yes	*No*	*Comment*
1. Does the child startle to sudden loud noise?			
2. Does the child look at you when you talk to him/her?			
3. Does the child come or look toward you when you call his/her name?			
4. Does the child respond to gesture and voice when you hold out your hand and say, "Come here," or, "Give it to me?"			
5. Does the child stop an activity when you say "No"?			
6. Does the child respond to names of family members?			
7. Does the child respond to names of familiar toys? clothing household objects			
8. Does child respond to simple directions given without gestural cues, e.g., "Sit down," "Come here," "Give me the ball?"			

II. Non-Vocal Expression

	Yes	*No*	*Comment*
1. Does the child communicate his/her need by looking at what s/he wants?			
2. Does the child reach for food or object s/he wants?			
3. Does the child turn away or push away to communicate "no?"			
4. Does the child crawl or walk to get something s/he wants?			
5. Does the child point toward something out of reach to ask for help?			
6. Does the child use gestures to communicate to you?			
7. Does the child imitate gestures you use, e.g., wave, clap, pat legs?			
8. Does the child use any symbolic gestures such as sign language?			

III. Vocal Expression

	Yes	*No*	*Comment*
1. Does the child cry?			

2. Can you tell the difference between cries?
3. Does the child laugh aloud?
4. Does the child "talk" to people?
5. Does the child "talk" when you approach, talking?
6. Does the child make any kind of vocalizations when something s/he likes is taken away from him/her?
7. If you imitate the sound s/he makes, does s/he continue to make sounds?
8. What kinds of sounds does the child make other than laughing and crying?
   (a) Vowels ______________
   (b) Consonant-vowel combinations ____________
   (c) Consonants ______________
   (d) Consonant-vowel combinations that sound like words
9. Does s/he use different intonational patterns?
10. Does the child ever imitate sounds that you make?
11. Does the child use question inflection?
12. Does the child use names (consistent sound combinations) for objects s/he wants?
13. Does the child say, "Hi," when someone says "Hi" to him/her?
14. Does the child imitate intonational patterns that s/he hears you make?
15. Does the child say, "No" or "No-no" when you ask him/her a question or take something away from him/her?
16. Does the child relate immediately experiences to another member of the family?

C. What Are The Situations For Best Communication?

Yes No Comment

1. What food does s/he like?
2. What toys does s/he like?
3. What activities does s/he like?
4. Which positions does s/he like? (e.g., lying on floor, sitting supported in small chair)

D. What are your primary concerns regarding this child's communicativeness?

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These working papers are intended primarily as informal communications to and among staff members, graduate students, and interested individuals. They may contain hypotheses, study proposals, reports of a study, critiques, etc., at any stage of refinement. This research was supported in part by a Bureau of Education for the Handicapped Contract no. 300-74-7989MOD 1.

Communication Management for the Non-Responsive Child: A Team Approach

Susan F. Soltman
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The Challenges of the Team Approach

Teachers and other staff members who work with severely/profoundly handicapped children are faced with many different problems. The children are hard to assess. They may have multiple problems which make it difficult to decide on treatment priorities. Many of these children show very slow gains, and staff and parents tend to be easily discouraged. It takes the cooperation of specialists in many disciplines to provide a useful and supportive educational program for severely handicapped children.

The Interdisciplinary Educational Team has proved to be a highly successful approach to meeting the needs of children in the programs for the severely/profoundly handicapped at the Experimental Education Unit of the Child Development and Mental Retardation Center, University of Washington, Seattle. In this setting, the Educational Team is made up of the parent, teacher, nurse, occupational therapist, pediatrician, family liaison specialist, and communication disorders specialist (C.D.S.).*

During the first Educational Team meetings, where all the concerns are voiced, the child's deficits in communication are nearly always identified as major problems by both parents and teachers. This major concern has resulted in an additional, particularly close working relationship between the teacher and the C.D.S. who work with these children. The process of working together which has been developed by this two-discipline team will be described in this article, with attention to the responsibilities of each of the team members as they work together to promote communication skills for severely/profoundly handicapped children. (See Rieke, 1974, cited in reference list, for additional discussion of this topic.)

The key to the team process is that the C.D.S. views the child in his/her classroom setting in terms of the variety of activities planned for him or her and the people s/he interacts with. Assessment and management decisions are directed to how the child functions day by day. The teacher and C.D.S. decide together on the basis of the classroom assessment what types of language or communication programs meet the needs of each child. The C.D.S. takes care to see that the language and communication goals are both communicatively useful in the child's environment and developmentally appropriate for each child. The teacher and the C.D.S. cooperate totally in designing and implementing the program.

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*The communication disorders specialist is a speech pathologist who is a specialist in communication development, both verbal and nonverbal, including language, speech, and prespeech functions.

Traditionally, a child who needed help with speech or language problems has been taken out of the classroom to work with a clinician in a separate therapy room. Recently, some clinicians have been working with children in a corner of the classroom where the children normally spend most of the school day. This shift has helped to open up lines of communication and fruitful cooperation between teachers and clinicians. Simply because of this proximity, specialists from the two disciplines have worked out many interactive plans that neither could have managed separately. Because the severely/profoundly handicapped child is in such need of interdisciplinary consideration, the new pattern of interaction has been especially promising for work with that child.

In this article we will explain the team process as it was implemented to meet the challenge of the very low functioning, unresponsive child. In the population of severely/profoundly handicapped children there are always some who demonstrate little, if any, communicative awareness. Some children appear to be so unresponsive to the people around them that it seems unrealistic to set communication goals for them. In these instances careful classroom observation and recording by a skilled communication disorders specialist are essential to determine in what subtle ways each child does respond and also to find out what events or combinations of events elicit any kind of response at all. It is then usually necessary for the teacher and C.D.S. to plan a management program which can be carried out throughout the day in the classroom. An explanation of the kind of planning and implementation needed for in-classroom program will be included later.

Summary

It is the purpose of this article to suggest an additional dimension for our work with severely/profoundly handicapped children--to suggest that management programs can be designed which permeate the child's day, and that such programs can affect habit patterns. These programs can be data based; therefore, all performance changes can be measured. The planning of such programs comes about through team efforts. Effective teamwork requires not only a willingness for people from different disciplines to cooperate, but also some guidelines--procedures--to facilitate this process. Although useful wherever teamwork is indicated, such interaction has been essential in developing communication programs for non-responsive children.

Procedures in the Team Process

The procedures which have been developed to facilitate the team process serve as guidelines in several areas. In the first place, the procedures delineate the tasks that need to be addressed in order to move from the identification of the problem through the management phases. Secondly, they indicate who is responsible for each step in the procedure and suggest the questions that need to be considered. The following chart outlines the steps in the procedures and indicates who is responsible for implementing them.

CHART 2.1

Communication Management Team Procedures

The Steps in the Team Procedure	The Team Member(s) Responsible
1. *Assessment request* Does (child name) have any responsive behaviors we can build on?	*Parent-Teacher-C.D.S.*
2. *Observations; systematic recording* What are the environmental situations, people, or actions which elicit responses from the child? What are the responses (child name) demonstrates?	*C.D.S.*
3. *Sorting information* Which situations get the most responses? What kind of responses occur most frequently?	*C.D.S.*
4. *Designing the intervention program* What will be the goal? What can the teacher do to facilitate more responses from (child name)? How often can the teacher intervene?	*Teacher-C.D.S.*
5. *Implementing the all-day program* What kind of data collecting and charting will be done?	*Teacher*
6. *Decisions for changes in the program* What do the data show?	*Teacher-C.D.S.*

Assessment Request Parent-Teacher-C.D.S.

The first step in the procedure is to assess each newly enrolled child during the first month of enrollment to determine how the child communicates, when s/he communicates, and what his/her developmental level of functioning is in the area of language. During the initial meeting with the teacher and the parent, the C.D.S. will want to find what concerns each one has in order to get an idea of what priorities the parent and teacher have set for communication at home and in the program. They also will indicate what bothers or frustrates them.

Example: Mrs. Burn said that her daughter, Shirley, had no awareness of people and, in fact, slept most of the time. Mrs. Burn reported she even had to force-feed Shirley. The teaching staff confirmed these statements. It seemed that the child was "non-responsive." The teacher and C.D.S. were both unwilling to "write off" the child, and the teacher requested that the C.D.S. observe Shirley in the classroom to see if she showed any subtle responses to her environment.

Observations: Systematic Recording--C.D.S.

The classroom assessment, which the C.D.S. does, involves a systematic recording of the child's communication behaviors. The C.D.S. may record the child's initiated behaviors or the child's responsive behaviors and the record will include the events both prior to and following the specified behavior. These records are then analyzed for decisions about effective management. A set period of time, ten or twenty minutes, can be established for recording, and arrangements can be made for the C.D.S. to record at different times during the day for a period of several days.

For the non-responsive child, the assessment involves a strategy of recording in detail the communicative interactions between the classroom staff and the child. The C.D.S. must pay special attention to what conditions in the room or what events evoke some kind of response from the child. It is also important to record what kinds of responses the child makes. These may be very subtle changes in posture or facial changes.

Example: Shirley, who is seven years old, is non-ambulatory. We observed that she could sit with support but had poor head control. It was hard to know how well she heard or how much she saw. She made no vocal sounds other than an occasional soft moaning. The teaching staff had observed that she sometimes looked in the direction of people, and they thought that she "stilled" when they played records.

It was difficult for the C.D.S. to observe and write down all of the antecedent conditions (environmental stimuli). There were so many things happening at one time that required attention: all of the visual, physical-motion, auditory, and tactile events which occurred around Shirley needed to be noted. A special form had to be developed. The recording also included documentation of the minute degrees of responses Shirley made such as closing her eyes, opening her eyes, or lifting her head.

Sorting Information--C.D.S.

When the systematic recordings of communicative interactions have been completed, the C.D.S. must sort through the data to find which antecedent events (environmental stimuli) resulted in the largest number of responses from the child. The data will also indicate how the child responded and what led to the highest level of response developmentally--that is, whether the response was non-verbal only or whether there were some sounds or even word approximations from the child.

Example: We will review the sorting procedure which took place with Shirley's data in detail later in this article. The results of the sorting were that clear patterns of response did indeed appear. Shirley gave a response 66% of the time. The response that occurred most frequently was that she would look at the adult. This response occurred when--as Shirley faced an adult--the adult walked toward her and talked to her. In other words, Shirley was most responsive when she had sensory input of seeing movement plus hearing auditory stimuli.

Designing the Intervention Program Teacher--C.D.S.

When the C.D.S. has the information which responds to the concerns of the teacher (or parent or major care provider), he or she is ready to meet with the teacher to review the results and to design an intervention program. Several needs may show in the data, and there will probably be several possible goals to select for the child. There may also be several management possibilities.

It should be made clear that this step in the procedure, designing the intervention program, is truly a time for team input and cooperative decisions. In some cases it will be appropriate for the C.D.S. to take the child from the classroom to a therapy room for individual work in a quiet, distraction-free place. In other instances the wiser decision will be for the C.D.S. to work within the classroom, developing a receptive or expressive language program for a child or a group of children. Teachers frequently prefer this alternative because it gives them opportunities to keep informed and to learn how to carry on with some of the programs. In still other situations, the decision may be to include the child in language programs which the teacher has ongoing or which are commercially available and appropriate for a given child or children. With children who are non-responsive or whose habit patterns we wish to alter as rapidly as possible, the decision to implement an all-day management program may be the best team decision.

If the decision is for an all-day management program, it is up to the teacher, with the help of the C.D.S., to decide what can be carried out in the classroom. A plan sheet is then written which describes in behavioral terms the goals and procedures for the program.

Example: In the program for Shirley, the teacher and C.D.S. first selected a goal. Shirley was to respond by looking at the adult. The team then discussed what the teacher could do to facilitate, that is, to increase the number of responses from Shirley. The teacher needed also to decide how many times she could reasonably expect the classroom personnel to take time to approach Shirley to seek a response.

Implementing the All-Day Program Teacher

After the teacher and the C.D.S. have decided which communication behavior they will attend to and what the management strategies are--in this instance, to increase the child's responsiveness--the teacher will be ready to inform the rest of the staff and to implement the program. It is helpful to post the goal or target in a conspicuous place where it can be seen easily by all the staff. This serves not only as a reminder, but assures consistency of management. Decisions about the kinds of data to be recorded and who will be responsible for them are also made at this time. During the team meeting, in addition to the plan sheet, a data form will have been designed, and the teacher or aide will be responsible for the data which monitor the child's progress.

Example: For Shirley, the selected goal was: Shirley will look at an adult who approaches her.

The management: The adults will approach and talk to Shirley when they are in her line of vision.

If she looks at the adult, the adult will pat her and praise her. If she does not look, the adult will give no reinforcement of any kind.

The data: Data were collected ten times over the course of the day. The correct/error data were marked by the adult at each trial. The data sheet was conveniently posted on the wall with the reminder board.

Decisions for Changes in the Program Teacher--C.D.S.

Both the C.D.S. and the teacher will be interested in following the data to see if the staff can add the intervention strategy to their interaction with the child and then to see what changes occur for the child. There are several possible problems which should be mentioned.

As with any teaching or behavior management program, a review of the data can help pinpoint necessary changes in the program. If the child is not having success at a desired rate it may be that (1) the antecedent event (what the teacher says or does to get the child to respond) needs to be changed, or (2) the consequent event (what the teacher does after the child responds) needs to be changed.

If the child has progressed to a high level of success in the present program, the C.D.S. and teacher need to plan the next step to keep the child moving toward higher developmental levels of communication. These are basic decision points in making changes within the child's present communication program.

The all-day program, which we are focusing on in this article, requires staff to be aware of two particular problems. These have to do with consistency and frequency. It is desirable that all members of the classroom staff be alert to the child's communication target and the procedure established to evoke the response from the child. If the procedure is too complicated or is not clearly explained on the reminder board, various staff members may be quite different in what they say and do; as a result the data may show that the child is making little progress in consistently responding. If there is inconsistency in how the program is being run and the inconsistency is adversely affecting the success of the child, this needs to be rectified by the C.D.S. and teacher.

Another problem with managing all-day communication programs has to do with the frequency of the trials. Teachers are often comfortable with what we refer to as "sit down" programs, wherein a specific amount of time is scheduled for the teacher or C.D.S. to sit down with the child and run the program. However, the all-day program is purposely designed to be done intermittently throughout the day. It provides a procedure for communicating with the child in a consistent manner where the child will be successfully responsive and the adult can reinforce that success. But because the trials are to be done between the ongoing teaching and caregiving activities, busy teachers and staff sometimes find it hard to get in the total number of trials each day. If this happens, the C.D.S. and teacher need to consider ways of handling this problem. In the next section of this article we will talk more about ways to work toward both consistency and frequency of trials in implementing an all-day communication intervention for the nonresponsive child.

The Team Approach in Action

In this section, we will review the steps of setting up a communication intervention program for a particular child (Shirley) and will include examples of the forms, charts, and plan sheets which were used. The purpose of these details is to provide guidance for those who wish to replicate the procedures. The information will undoubtedly also suggest ways of adapting present procedures which are used in a variety of settings by staff who work with low-functioning, non-responsive children. It may be helpful to refer to Chart 2.1 throughout this section.

The Child: The Challenge

When Shirley was enrolled in the program, she was 9½ years old. She was a profoundly retarded child whom doctors had described as functioning at the 1-month level of development. She was very small, weighed 47 pounds, and had a history of serious feeding problems. She had been tube fed until she was five, but was presently being spoon fed. However, she had developed no chewing behaviors. She did not sit without support. She had fair head control in supported sitting, but her basic muscle tone was hypotonic, or "floppy." Shirley had been referred to the program at the Experimental Education Unit by the staff of a nearby suburban school district, where she had been cared for in a class for severely handicapped children for one year. Prior to that time there had been no public school programs for children like Shirley, so she had been at home with her parents and two older brothers. The referring teacher was concerned because all the staff had been able to do in the way of service was to take care of Shirley's feeding and diapering and to provide physical therapy through passive exercises.

Assessment Request

When Shirley was enrolled in this school, the Educational Team met to discuss plans for her instruction. Shirley's mother said her greatest concern was that Shirley get enough caloric intake to maintain or gain some weight. Feeding Shirley was still a problem, because she seemed to be hypersensitive to touch around and in the mouth. The feeding at home took an inordinate amount of time. The C.D.S. asked how Shirley communicated her likes, dislikes, or needs. Mrs. Burn replied that Shirley seemed to be unaware of people, but did express her dislikes when food touched her mouth: she would frequently turn her head away from the spoon. Mrs. Burn thought she recalled Shirley looking at people occasionally, but was not sure if this was a coincidence or was done in response to attention from people around her. Mrs. Burn said, "Actually, we're not sure just how much she can see or hear. She really sleeps much of the time and just doesn't seem to be interested in her environment."

At the conclusion of the conference, the parent, the teacher, and the C.D.S., along with the other members of the Educational Team, agreed that a communication assessment would be done, but that Shirley's immediate need was in the area of feeding and maintenance of muscle tone.

The first assessment that was attempted was an adaptation of the type of formalized procedure usually administered. The C.D.S. presented a variety of loud sounds, noise makers, and voice stimuli in the classroom to try to elicit from Shirley some consistent, observable response. Shirley did not show any consistency of response. She only occasionally looked at the face of the person talking to her.

The teaching staff decided to try a training program to develop in Shirley some consistent turning to sound and some eye contact. Those instructional programs were written as structured, "sit down" programs for specific time periods each day. At the end of 10 weeks, the data showed no progress, even with several changes in reinforcers. It seemed that Shirley was not ready for these direct training programs. Therefore, they were dropped. The staff continued with the motor, feeding, and sensory stimulation activities which comprised the rest of Shirley's school day.

Mrs. Burn, the teacher, and the C.D.S. were unwilling to "give up" on Shirley. What concerned them was that the classroom staff were inadvertently paying very little attention to Shirley except during times when they worked specifically with her. This was understandable. It was easy to forget to communicate socially with a child who gave virtually no response to any of the efforts of the staff. But the C.D.S. did have some information from the questions she had asked during the first meeting. Did Shirley have any responsive behaviors to build on? The mother had reported that she sometimes looked at people, but no one knew what situations caused her to look. The new concern which was raised from the classroom situation was how to get some kind of social interaction to occur there.

At a meeting with the staff from the classroom, the C.D.S. summed up the assessment questions as follows:

1. How can we get the classroom staff to encourage responses from Shirley at times throughout the day, especially during those times when Shirley is presently left unattended?

2. What kind of social or communicative approach will elicit a response from the child?

3. What level of response is most likely to occur (in other words, what response can the adult expect to get from Shirley that will be possible to reinforce)?

It was clear that recording all of the environmental conditions in a busy classroom of six children and three adults and observing all of the very subtle responses Shirley might make would be a real challenge for the C.D.S.

Observation: Systematic Recording

There are many kinds of recording forms which are useful when the C.D.S. is observing the communicative behaviors of children. The form described here is set up to direct the recorder's attention to two particular aspects of communicative interaction in the classroom: namely, what events in the environment trigger any response and what kind of response it is. The form is designed so observations directed to these two questions can be systematically and accurately recorded.

1. Environmental Antecedents. Does the child respond to any combination of visual, tactile, auditory, or kinesthetic input from the communicative environment of adults and children in the classroom?

2. Pupil Behavior-Responsive. If the child does respond, what are the kinds of responses he or she makes?

Another useful form has been the four column format. The third column is used to include any initiating behaviors (what the child does to make his or her needs known or to get attention from others), and a fourth column is used to record observations of what others do to respond to the child when he or she initiates a need or seeks attention. However, for Shirley, a simple two column form was sufficient.

The C.D.S. checked with the teacher to find out which times during the day would be best for observing, that is, times at which Shirley was not scheduled for teaching activities. In this instance, a mutually agreeable time was arranged on three consecutive days, and data were recorded for 10 minutes each day.

The teacher and staff were instructed to "try some things" they thought might elicit a response from Shirley. The C.D.S. arranged to record what happened. Other than that open request to attempt eliciting a response, the staff were asked to keep the interactions as natural as they could as they went about their normal classroom activities.

The C.D.S. watched Shirley and recorded all attempted interactions in very brief terms. The C.D.S. was looking for answers to the following questions:

Communication Behavior
Observation and Recording Form

Environmental Antecedents	Pupil Behavior (responsive)

Communication Behavior
Observation and Recording Form

Environmental Antecedents	Pupil Behavior (Response)	Pupil Behavior (Initiates)	Adult Response

CHART 2.4

Communication Behavior
Observation and Recording Form

Pupil: Shirley Recorder: Soltman

Time: 9:20–9:30 a.m. Data: 10/1/75

Environmental Antecedents	Pupil Response
1. Bell to side of pupil	1. Turns head and looks
2. Adult talks and approaches	2. Looks at adult
3. Adult talks	3. Looks up at adult
4. Adult walks away	4. Looks at adult
5. Adult says "Hi, Shirley!"*	5. Turns head and looks at speaker
6. Adult says "Hi, Shirley!"*	6. No change
7. Adult approaches	7. Turns to, looks at adult
8. Adult talks to pupil	8. Turns away from speaker
9. Adult talks and touches pupil	9. Looks, turns away from adult
10. Adult says "Hi, Shirley!"	10. (Head down) no change
11. Adult says "Hey, Shirley" and touches	11. Head up
12. Adult approaches and talks to pupil	12. (Head down) no change
13. Adult touches and talks to pupil	13. Looks at adult

***Stimulus is more than 6′ away from pupil**

1. What are the environmental situations, people, actions that make changes?

2. What are the responses Shirley makes?

It was exciting to see that Shirley did indeed respond at least some of the time by looking or turning her head. After three days of data had been gathered, it was necessary to sort this running log of interactions so the results could be shared with the classroom staff. The sorting procedure is described in the next section.

Sorting Information

The basic questions were asked when the recording form was designed; they concerned the need to figure out how to sort the data. The C.D.S. asked herself what she wanted to know from the data and how many categories of answers were recorded. In this situation with Shirley, the questions were:

1. What types of communicative interactions get the most responses from Shirley (Environmental Antecedents, Column 1)?

2. What kinds of responses did she give most frequently (Pupil Behavior, Column 2)?

3. What percentage of the time did Shirley respond?

The types of environmental communicative antecedents from the first column of the systematic sampling data are listed vertically on the left of Chart 2.5, How to Sort the Data. These antecedent events are grouped into seven categories.

The data responsive to Question 2 ("What kinds of responses did she give most frequently?"), which were gathered from the Pupil Behavior, Column 2, were listed horizontally across the top of Chart 2.5 and fell into eight types of responses.

At this point, the information which was written out in a running log in Chart 2.4 was sorted onto Chart 2.5 and tallied so it could be more readily analyzed.

When we look at the results of this data sorting, we find the environmental antecedent which elicited the greatest number of responses (9) from Shirley was when an adult who approached her also talked to her while moving toward her. Shirley was most responsive when she had both auditory stimulation (someone talking to her) and visual stimulation (someone moving toward her). In

CHART 2.5

How to Sort the Data

Pupil: Shirley Recorder: Soltman

Total time: 30 minutes Total dates: 9/30, 10/1, 10/2

Question: What kinds of communicative response behaviors does the pupil have?

	Pupil Behavior								
Environment Antecedents	no change	opens eyes	head up + looks	looks at	turns eyes to	turns head, looks	turns head away	makes sound	total responses
1. Adult approaches, talks + touches	0	0	0	0	0	0	0	0	0
2. Adult approaches + talks	2	0	0	7	0	2	0	0	9
3. Adult approaches	0	0	0	0	0	1	0	0	1
4. Adult talks to	5	0	1	0	0	0	2	0	3
5. Adult talks + touches	1	0	1	1	0	0	1	0	3
6. Adult walks away	1	0	0	0	1	0	0	0	1
7. Adult moves pupil's wheelchair	2	1	0	0	3	0	0	0	4
TOTAL	11	1	2	8	4	3	3	0	

Results:

responds = 21 = approximately 66%

no change = 11 = approximately 34%

answer to Question 2 ("What kinds of responses did she give most frequently?"), it is clear that Shirley responded eight times by looking at the adult who was in her line of vision and who was talking to her. It is interesting to note that when adults only talked to Shirley (auditory input only), she was the least responsive: five times she showed no change in her behavior, twice she turned away, and only once did she lift her head and look at the speaker.

It would have been helpful to have this information before the sit-down program for increasing Shirley's looking behavior was attempted. It appears that auditory input, e.g., a voice at close range saying "Look, Shirley," was not a sufficiently strong stimulus to elicit a looking response from the child. It may, in fact, have been aversive, since twice Shirley turned away from the person talking to her.

At this point, it should be stressed that these conclusions are only areas to probe, since they are based on a small sample of data. The information should be used as a starting point for further investigation.

In answer to the third question ("What percentage of the time does she respond?"), the results of the tally show that Shirley responded 66% of the time. This was good news indeed to the people working with her. At least they had a positive starting point for a child for whom they previously had virtually no hope. Since Shirley did have some responding behaviors, it was time to design a communicative intervention program to increase her responding.

Designing the Intervention Program

The C.D.S. and the teacher met to discuss the results of the data which had been recorded. They reviewed Chart 2.5. Since Shirley had not responded well to the earlier training program, which presented consecutive trials, the teacher and the C.D.S. decided that an all-day communication intervention was appropriate and should be designed for Shirley. Such a program, which would distribute the trials over a longer period of the day, would increase the teachers' opportunities for success and the child's opportunities to respond and to be reinforced for responding. For Shirley, who was so unresponsive to the people in her environment, it was important to increase the number of social responses and the consistency of these responding behaviors before a more structured "sit-down" responding program could be designed and implemented. In short, an all-day program would help the staff to be consistent and would encourage them to interact with Shirley throughout the day. The teacher and C.D.S. hoped that such a plan would result in an increase in Shirley's responses. In time, this increase should build toward a higher level of response or a broader variety of responses.

Setting the Goal and the Objectives

The teacher and the C.D.S. decided that the goal would be for Shirley to respond consistently by looking at the adult. This was selected because it was the type of response which occurred most frequently on Chart 2.5. With a different child, the data might have revealed two or three types of behaviors from which to select a goal. In that case, the behavior at the highest developmental level would have been chosen. It is, of course, important for the C.D.S. to be knowledgeable about the variety of developmental sequences which comprise the area of communication, language, and speech.

The Management Plan

Since the data recorded from the classroom observations had been so explicit, it was easy to arrange a management plan. (For a more extended discussion of management planning, see Haring & Gentry, 1976, cited in the reference list.) The teaching staff were instructed to use those strategies which the analysis of the data showed to be most effective in getting a response from Shirley. They would talk to her as they walked toward her. They would expect her to look at them. The rationale for this strategy appears in Chart 2.5, where we see that the environmental antecedent of an adult walking toward Shirley and talking to her resulted in more responses from her than any other type of situation. This, then, became the plan.

The next step in setting up the program was to plan what to do when Shirley does look and what to do if she does not respond by looking. These decisions complete the first phase or the basic program plan. In Shirley's case, the teacher wanted to give social praise and friendly touching to Shirley whenever she responded by looking at the adult. If she did not look, the adult would move on and give her no attention. Social praise and attention were chosen because at this time social praise, including touching, was the easiest and most natural for the busy teaching staff, and the teacher knew that food was not reinforcing. The search for a more powerful reinforcer might be needed, but that decision was deferred pending the outcome of the data to be recorded.

How Often Can the Program be Run?

The teacher wanted a consistent number of trials to be given each day. This would accomplish two things: It would make data collection and recording simple for the classroom staff, and it would help the staff remember to perform a specified number of trials for Shirley each day. This plan tried to meet the problem the staff had of forgetting to interact with this non-responsive child.

The teacher felt that, during a five hour school day, the adults could easily complete 10 trials among their scheduled activities with all of the children. The trials were to be intermittently presented. With all-day programs, it is important to be realistic about what can be added to the responsibilities of an already busy teaching staff. It is better to set the number of trials low and have the staff offer to do more than to overload them. Teachers need to be successful too!

The decisions for Shirley's all-day communication intervention were set down on a plan sheet, and the first day of the systematic intervention was written.

CHART 2.6
Plan Sheet

Type of Movement Cycle: Communication

Plan Sheet No. 1 PUPIL: *Shirley* DATE: *October, 1976* LOCATION: *Room 5* MANAGERS: *Foster + staff*

YEARLY OBJECTIVE: *To respond to a variety of social stimuli* QUARTERLY OBJECTIVE: *To respond by looking*

DATE	TEACHER ACTIVITY PROCEDURE/PREPARATION	CHILD BEHAVIOR—CORRECT—CONSEQUENCE			CHILD BEHAVIOR—ERROR—CONSEQUENCE	
10/5	When facing Shirley, *talk* to her as you *walk toward* her Ten times per day; intermtttently through day	To look at adult	1:1	Praise her, pat her	Does not look at adult	None
11/10	Same	Same	1:1	Praise her, tickle her tummy	Same	Same
3/6	Same plus reminder: trials are to be done *intermittently* throughout day	Same		Same	Same	Same

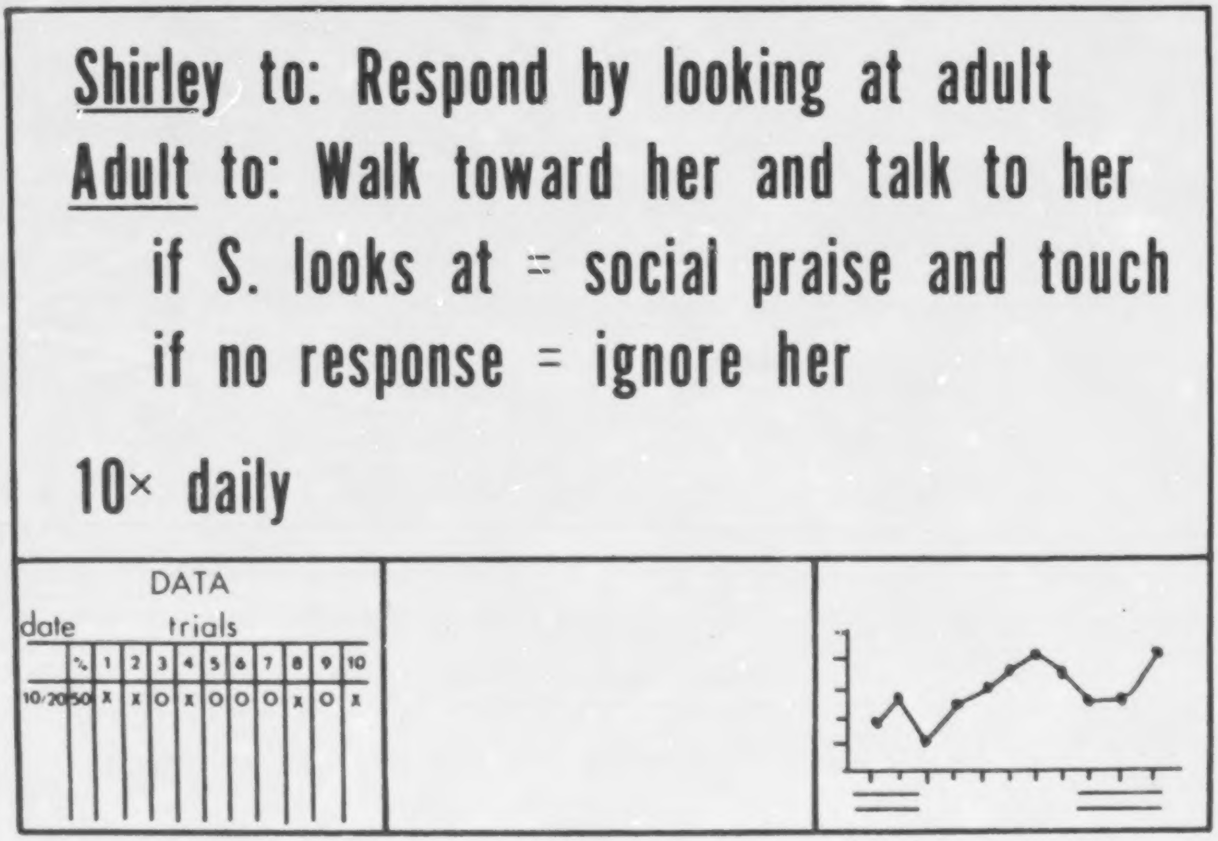
The plan sheet was part of Shirley's educational program which the teacher kept on the child's clip board. As changes in the plan were made, the teacher added these changes to the existing plan sheet. This allowed for an easy review of the exact steps in the program. The plan sheet should be concrete and brief, but with sufficient detail that any staff member or substitute teacher could read the plan sheet and implement the program.

Implementing the Program

The teacher explained Shirley's program to her aides and parent helpers. Shirley's class had a variety of helpers throughout the week who assisted the teacher and her staff. Because of this, the teacher made a reminder board, which was printed in 3" letters and posted on the wall. This described: (1) what Shirley was to do, (2) what staff members were to do, (3) what to do if Shirley responded, (4) what to do if Shirley did not respond, and (5) how many trials were to be completed per day.

A data sheet to keep a record of Shirley's responses was taped to the bottom portion of the reminder board. The data sheet served not only to keep an accurate record of whether or not Shirley responded, but it also was a visible reminder to the adults of how many trials had been given during the day.

The teacher and the helpers found it convenient to mark the data sheet after each trial. Ten trials can be converted into a percentage of correct responses very easily. The C.D.S. transferred the results of the daily records to the graph of programs every two weeks preceding the regular Educational Team meeting. During the meeting, Shirley's communication program was studied along with her other programs as her progress and that of the pupils in the class were reviewed. The data indicated progress and the need for changes in the programs.



Shirley to: Respond by looking at adult

Adult to: Walk toward her and talk to her

if S. looks at = social praise and touch

if no response = ignore her

10× daily

DATA

date	%	1	2	3	4	5	6	7	8	9	10
10/20	50	X	X	O	X	O	O	O	X	O	X

Reminder Board

Decisions for Changes in the Program

The percentage graph and the data sheets are helpful tools in making decisions for change. Shirley was responding on an average of 38% of the trials during the first two weeks after the program began. Over the next two weeks, she increased her looking at people to an average of 60% of the trials presented. However, her responding decreased again, and the graph dropped back to 44.5% rate of response during the following two week period. What was happening? The teacher wondered if social praise and touching were strong enough reinforcers for Shirley. The classroom staff had noticed that she seemed to enjoy being tickled--a consequence which had been used as a reinforcer in another program. The Team decided that it was worth trying. Some change was surely indicated, so tickling was added to the program plan in hopes that the tickling would serve as a reinforcer for the looking response as well.

The instructions to the classroom staff which appeared on the plan sheet (11/10) and on the reminder board now included social praise plus gentle tickling every time Shirley responded by looking at the adult who approached and talked to her. The change in Shirley's responding was soon evident. The percentage of correct responses began to go up once the tickling had been added as a reinforcer.

The Need for Consistency

The information one gets from a graph can indicate problems in the intervention plan, but sometimes it is the incidental observations made by a teacher or by the C.D.S. which pinpoint the cause or find the remedy. This was true at a point later in Shirley's program--five months after her communication program had begun. Those who work with profoundly handicapped children recognize that progress is often slow with these children and that maintaining a 60-70% correct rate of response is considered commendable. We have learned also that children so severely involved often behave very inconsistently from day to day. Health related problems such as seizure activity or medication management often make differences in the way the child responds. During the fifth month of this responding program for Shirley, the C.D.S. noted that the data showed a marked decline (from the 60-70% correct range down to 35%). The C.D.S. talked to the teacher about the change, but the teacher had no clues. They wondered whether the cause could be related to a health problem. However, when Shirley's other programs were reviewed, she appeared to be doing well in other areas.

Shortly thereafter, when the C.D.S. was working in the class with another child, she noticed that a new helper was hurrying to catch up on the number of trials needed to complete Shirley's communication program. The new aide did five trials consecutively, quickly marked the data (all "no response") and hurried on to the next task. Shirley was not ready for consecutive trials. The data were reflecting this. The reminder board was again changed to say, "Trials are to be done intermittently throughout the day." This information was also recorded on the plan sheet (date 3/16). Following this, the mean number of correct responses rose to 75% over the ensuing month. It was clear that the information on the reminder board had not been clear enough to be understood by all the people working with Shirley. This problem alerts us to the importance of reviewing the information on the board with all of the staff members from time to time. The review can be done by the teacher or by the C.D.S.

When several people are involved in implementing all-day programs for the children, it is important to check periodically to see that the procedures being used are consistent with the plan. Consistency of program management is important. Such consistency allows us to gather the information we need in order to know what helps these children and what does not help them.

Frequency of Trials

The all-day program for communication intervention provides a plan for communicating with a child when a frequent number of trials is necessary to change a habit pattern--and where consistency of management is also important. When the plan is carefully written, it gives the teachers information about what kind of response can be expected from the child: that which the child can successfully accomplish. In the case of Shirley, who seemed not to respond, it was important for her to have success in responding throughout the day--at a response "level" of looking. The requirement was for enough success to begin changing Shirley's non-responding pattern. The data in this case clearly indicated that the number of trials necessary to change the habit pattern needed to be spread throughout the day rather than administered consecutively.

The first important information the classroom staff needs is what response a given child can make. Then they need to know what strategies will get that response from the child. (For Shirley, the response was looking; the strategies were talking as one walked toward her and then tickling her gently and providing social praise.) The other important decision which needs to be made concerns the number of trials necessary to change the behavior--as in this case, to increase the behavior (looking). This case study demonstrates the importance of an all-day program with intermittent trials for success, as opposed to a "sit down" program with successive trials.

It has been our experience that when staff time is heavily committed to other programs or when there is no visible or regular reminder, busy staff tend to forget to provide a sufficient number of trials; consequently the reinforcement cannot be given enough times to increase the desired behavior.

At the time this article was written, Shirley had been in the program at the Experimental Education Unit for seven months. She was becoming a responding child. She looked at people when they approached her while talking to her.

Reviewing the Data Again

The Team

The question asked in Number 6 of the procedures outlined earlier in this article was, "What do the data show?" The data continued to show success for Shirley in her communication program about 60% to 70% of the time. Shirley's many other needs and the needs of her classmates consumed the time allotted for staffings. Also, as the staff became busier with more children and additional programs planned to meet the many needs of the children, the teacher began to notice a decrease in the number of trials given Shirley on this all-day program. There were fewer tallies on the data sheet provided. Again, the teacher contacted the C.D.S., and they shared their mutual concern. The C.D.S., who also checked the tally sheet regularly, had noticed that there were many days which could not be charted. At the following Education Team meeting, they discussed this problem and agreed that the staff needed the weekly feedback and praise from the C.D.S. to help them remember Shirley's data and to keep them going. Even though Shirley was responding by looking, this type of response appears not to be very rewarding for those who live in a culture where communicative interaction is usually verbal. Also, when gains are made very slowly, or when it takes continued management strategies simply to maintain the gains that have been realized, the staff members who work closely with severely and profoundly handicapped children need the support of other personnel, such as the C.D.S., to keep them motivated. This is a factor which needs to be recognized and time for it allotted in the schedule of all staff members. In the case of Shirley, the immediate staff who worked with her day after day needed to know what kind of response they could expect from her, the strategies which would secure this response, the visible reminder from the reminder board, the visual feedback from the daily graph, and the regular sharing with the C.D.S. When the C.D.S. and the teachers review the data at regular meetings, the review serves as a dynamic vehicle for making changes in programs and for providing feedback to the staff. It is often necessary for the C.D.S. to stop by the classrooms, review the data, and commend the staff. The head teacher frequently makes this request, but it is a good practice whether requested or not.

Summary

We have discussed not only the challenges of the team approach, but also the many advantages of the team for those who work with severely/profoundly handicapped persons. In this connection we have outlined a process for facilitating team decisions and effective management procedures. With particular reference to very low-functioning, non-responsive persons, the all-day management plan has been a way to effect changes in children.

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Communication Assessment for the Non-verbal Pupil
(a working paper)

Susan Soltman

To the Teacher:

This communication assessment is designed for the non-verbal pupil, to assess the earliest development responses to spoken language. It can be used with pupils functioning between the 4th month to 24th month developmental level.

Older pupils who are functioning at this early developmental level are frequently untestable in the usual formal testing situation. This in-depth testing provides for five to ten trials on each item, which is helpful to determine the actual functional ability for the pupil who is inconsistent or even non-responsive in the formal testing situation.

The assessment can be done by the classroom teacher throughout the day, in an informal and natural manner. Testing should be stopped when the pupil shows signs of inattention. Do not repeat the same item trial after trial; randomly change from item to item as fits the classroom situation. Fit the items into natural situations whenever possible. Always reward an attempted response, even if it is incorrect, with social praise appropriate to the situation. If the child does not respond, of course, there is no need to reinforce him/her.

The pupil's ability to understand spoken language is assessed at three levels. The highest level, Level 1, assesses the pupil's ability to respond appropriately, upon hearing simple verbal directions or social greetings. The next level, Level 2, gives the pupil the same verbal directions or social greetings plus gestural cues. The Learning Probe, Level 3, includes the same verbal directions plus physical assists. After five tirals of physical assists the pupil is given Level 2 instructions to probe his/her ability to retain the new response without physical cues from the teacher. A protocol for the Learning Probe is presented at the beginning of that section.

Begin testing at Level 1. All items passed with 80% correct are considered learned behaviors and need not be tested at the next level. Give each item five trials. Go on to ten trials only if the pupil's pass/fail performance is inconsistent during the first five trials.

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Communication Assessment For Non-Verbal Pupils

Pupil:

B.D.:

Date Began:

Date Completed:

Recorder:

Level 1: Pupil responds to verbal cue (without help of gestural cue)

ADULT ANTECEDENT	PUPIL BEHAVIOR	TRIALS										
(verbal cue)	(in response to verbal cue)	1	2	3	4	5	6	7	8	9	10	% Correct
1. Approach + social praise + smile at pupil.	1. *Smiles* at adult											
2. Face pupil and say, "Look, (name)."	2. *Looks* at adult											
3. When pupil is not facing adult, say, "(name)."	3. *Turns to* adult (when s/he hears his/her *name*)											
4. Say, "Come here, (name)."	4. *Comes* toward adult											
5. When pupil is touching an object, say, "No, don't touch."	5. *Stops touching* object											
6. When pupil has an object in his hand, say, "Give it to me."	6. *Gives* object to adult											
7. Select two or three objects pupil is familiar with, set them in a row and say, "Show me the (object)."	7. (Knows *names* of familiar *objects*) touches/looks at/gives/correct object.											
8. "Show me your nose" "Show me your eyes" "Show me your hair" "Show me your mouth" "Show me your ears"	8. Touches/wiggles *nose* Touches/wiggles *eyes* Touches *hair* Touches/wiggles *mouth* Touches *ears*											

ADULT ANTECEDENT	PUPIL BEHAVIOR	TRIALS										
(verbal cue)	(in response to verbal cue)	1	2	3	4	5	6	7	8	9	10	% Correct
9. Say, "Sit down."	9. *Sits* down											
10. Say, "Stand up."	10. *Stands* up											
11. (Object is in front of pupil.) Say, "Get" or "Pick up the (object)."	11. *Gets* object (picks up object)											
	If pupil passes number 11, go immediately to number 12											
12. Say, "Put the (object) on the floor."	12. *Puts* object											
13. Say, "Hi, (name)."	13. Makes *sound/ smiles/looks*											
14. Hold out a desired object, e.g., food s/he likes, say, "Do you want a (__________)?"	14. Nods head *yes* (Correct response = gets item)											
15. Hold up aversive object, e.g., food s/he dislikes, say, "Do you want to eat this (__________)?"	15. Shakes head *no*											
16. When an object known to the pupil is near and in plain sight, e.g., sandwich in his/her lunch pail or coat nearby on a chair; say, "Where is your (object)?"	16. *Finds* object by pointing to, looking at, touching the object											

Level 2: Pupil responds to *verbal* cue plus *gestural* cue

ADULT ANTECEDENT	PUPIL BEHAVIOR	TRIALS										
(verbal cue + gestural cue)	(in response to verbal cue + gestural cue)	1	2	3	4	5	6	7	8	9	10	% Correct
1. Approach, social praise, point to smile on own face	1. *Smile*											
2. Face pupil, *touch* his/her shoulder, say, "Look, (name)."	2. *Looks* at adult											
3. When pupil is not facing adult *touch* his/her shoulder and *say*, "(name)."	3. *Turns* toward adult											
4. *Beckon* to pupil and *say*, "Come here, (name)."	4. *Comes* toward adult											
5. When pupil is touching an object, *hold hand in gesture* to "stop" and *say*, "No, don't touch!"	5. *Stops* touching object											
6. When pupil has an object in his/her hand, *hold out your hand* and *say*, "Give it to me."	6. *Gives* object to adult											
7. Select two or three objects pupil is familiar with, set them in a row, *point*, and *say*, "Show me the (*object*)."	7. (Knows *names* of familiar *objects*) touches or looks at or gives											
8. *Point* to your own and *say*: "Show me your nose." "Show me your eyes." "Show me your hair." "Show me your mouth." "Show me your ears."	8. Touches/wiggles his/her *nose*. Touches/wiggles his/her *eyes*. Touches his/her *hair*. Touches/wiggles his/her *mouth*. Touches his/her *ears*.											
9. *Point* to chair and *say*, "Sit down."	9. *Sits* down											

ADULT ANTECEDENT	PUPIL BEHAVIOR	TRIALS										
(verbal cue + gestural cue)	(in response to verbal cue + gestural cue)	1	2	3	4	5	6	7	8	9	10	% Correct
10. Gesture for pupil to stand and *say*, "Stand up."	10. *Stands* up											
11. Object is in front of pupil; *point* to it and *say*, "Get" or "Pick up the (object)."	11. *Gets* object (picks up object) If pupil passes number 11, go immediately to number 12											
12. *Point* to the floor and "Put it on the floor."	12. *Puts* object											
13. *Wave* and *say*, "Hi, (name)."	13. Makes *sound/waves, "hi"/smiles/look*											
14. Hold out a desired object, e.g., food s/he likes, *say*, "Do you want a (________)?" *Cue by nodding* your head "yes."	14. Nods head yes (correct response = gets food item)											
15. Hold up aversive object, e.g., food s/he dislikes, *say*, "Do you want to eat this ________?" *Cue by nodding* your head "no."	15. Shakes head *no*											
16. When an object known to the pupil is near and in plain sight (e.g., sandwich in his/her lunch pail or coat nearby on a chair), *say*, "Where is your (object)?" Give gestural cue by *pointing* to the object.	16. *Finds* object by pointing to or looking at or touching the object.											

Learning Probe

Protocol:
1. Present five trials at level three followed immediately by five trials at level two on each test item.
2. Reinforce all correct responses at level three.
3. Reinforce all correct responses at level two.
4. If pupil misses first three trials at level two, stop testing that item.

Level 3 - Verbal & Physical Assists		Verbal & Physical Assists					Verbal & Gestural Cues					
ADULT ANTECEDENT	PUPIL BEHAVIOR	TRIALS Level 3					TRIALS Level 2					% Correct at Level 2
(Verbal cue & physical assists)	(In response to verbal & physical cues)	1	2	3	4	5	1	2	3	4	5	
1. Not testable at this level.	1. *Smile*											
2. Face pupil. Hold hands to side of pupil's head, say, "Look, (name)."	2. *Looks* at adult											
3. When pupil is not facing adult, *say*, "(name)" and *turn* his/her body to face you.	3. *Turns* to adult											
4. *Say*, "Come here, (name)" and *pull* him/her toward you.	4. *Comes* toward adult											
5. When pupil is touching an object, *say*, "No, don't touch," and *take his/her hand* away from the object.	5. *Stops* touching object											
6. When pupil has an object in his/her hand, *say*, "Give it to me," *pull the hand* to you and take the object.	6. *Gives* object to adult											
7. Select two or three objects pupil is familiar with, set them in a row, and *say*, "Show me or "Give me the (object)"; then *move his/her hand* to *pick up* or *point to* the object.	7. *Points* to or *gives* correct object											

Level 3 - Verbal & Physical Assists

ADULT ANTECEDENT	PUPIL BEHAVIOR	TRIALS Level 3 (Verbal & Physical Assists)					TRIALS Level 2 (Verbal & Gestural Cues)					% Correct at Level 2
(Verbal cue & physical assists)	(In response to verbal & physical cues)	1	2	3	4	5	1	2	3	4	5	
8. *Say*, "Show me your (body part)"; *point his/her hand* to: nose eyes hair mouth ears	8. Touches eyes Touches hair Touches mouth Touches ears											
9. *Say*, "Sit down" and *help the child* sit by moving him/her to a sitting position.	9. *Sits* down											
10. *Say*, "Stand up" and *pull* him/her to a standing position.	10. *Stands* up											
11. (Object is in front of the pupil) *say*, "Get the (object)" or "Pick up the (object)." Then *place his/her hand* on the object and pick it up.	11. *Gets* object											
	(Follow immediately with number 12)											
12. While still helping pupil, hold on to the object in number 11; *say*, "Put it on the floor." Then *move his/her hand* to release the object onto the floor.	12. *Puts* object											
13. Wave and say, "Hi, (name)" *take his/her hand* and wave "hi."	13. *Waves* "hi"											
14. Hold out desired object, e.g., food s/he likes, *say*, "Do you want a	14. Nods head "*yes*"											

Level 3 - Verbal & Physical Assists

ADULT ANTECEDENT (Verbal cue & physical assists)	PUPIL BEHAVIOR (In response to verbal & physical cues)	Verbal & Physical Assists TRIALS Level 3					Verbal & Gestural Cues TRIALS Level 2					% Correct at Level 2
		1	2	3	4	5	1	2	3	4	5	
(_________)?" As s/he reaches for it, say, "Tell me yes," and *move his/her head* up and down in a "yes" nod (then give him/her the item).												
15. Hold up aversive object, e.g., food s/he dislikes, say, "Do you want to eat this?" As s/he moves away or looks down, *say*, "Tell me *no*!" and *move his/her head* back and forth in a "no" motion.	15. Shakes head "*no*"											
16. When an object known to the pupil is near and in plain sight, e.g., sandwich in lunch pail or coat nearby on a, chair, *say*, "Where is your (object)?" *Take his/her hand* and help him/her point to the object.	16. *Finds* object by pointing to or touching											

This is a working paper developed at the Experimental Education Unit, CDMRC, University of Washington, under the Grant for Severely Handicapped, by Susan Soltman, Communication Disorders Specialist.

SOURCE: Sequenced Inventory of Communication Development, Hedrick, D.L., Prather, E.M., and Tobin, A. Seattle: University of Washington Press, 1975

Language Assessment Aid for the Classroom Teacher Adapted from the Sequenced Inventory of Communication Development

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*The Sequenced Inventory of Communication Development, Hedrick, D. L., Prather, E. M., and Tobin, A. Seattle: University of Washington Press, 1975.

Language Assessment Aid for the Classroom Teacher

R. Fay Shafto
Susan F. Soltman

Introduction

Language Assessment: What is it?

This is an assessment tool for use with children who are functioning between the 4 month to 4½ year developmental levels regardless of their chronological age. It is useful for preschool teachers, Head Start teachers, and special education teachers who are interested in individualizing their programs to meet the needs of children who appear to need help in language comprehension, or language usage in communicating with others.

The language and communication behaviors are ordered according to normal child development and are sequential in nature, starting with such simple communication responses as looking at an adult who is talking and moving to such complex verbal behaviors as talking in four to five word sentences, including formation of past or future tense of verbs.

The assessment items are divided into three sections: (1) Receptive Language, (2) Expressive Language which may be tested, and (3) Expressive Language which can be observed and noted by the teacher.

Receptive Language

Receptive language behaviors indicate a child's understanding of what s/he hears.

Section I: Receptive items. This section calls for the child to respond non-verbally, with actions, to the teacher's verbal requests. For example, the teacher says "Put the doll in the bed," and the child does so. Or the teacher says "Show me the little car," and the child selects the smaller toy car.

Expressive Language

Expressive language behaviors are divided into two sections.

Section II: Expressive language which can be tested. This includes, first, motoric and then verbal responses to the teacher's requests or questions. These items can be directly tested beginning with early developmental items. For example, the child will imitate the teacher by attempting to clap his/her hands when s/he sees the teacher clap. This section then progresses to more difficult responses. The child who is functioning at a later developmental level has mastered simple imitative responses and can now respond verbally when the teacher asks questions such as, "What are scissors for?" or "How many blocks do you see?"

Section III: Expressive language to be observed. This section includes communication behaviors which the child will initiate on his/her own as s/he interacts with people in the classroom. These expressive vocal and verbal behaviors are also developmental and sequential in nature. This section begins with early communicative actions such as: the child laughs or babbles when people are near. Then at a later developmental stage the child will tell about immediate experiences, using past and future tense verb forms in four to five word sentences.

Who Can Use It?

This assessment is designed for the classroom teacher to use. The items are selected from The Sequenced Inventory of Communication Development[1] on the basis of their relevance from the classroom teacher's point of view. That is, the communication behaviors to be assessed will be such that after the assessment is finished, the teacher will be able to gear her expectations for the child to his/her level of functioning and will be able to facilitate development of new skills for the child.

As noted, some of the items in the observation section for Expressive Language are to be assessed by the communication disorders specialist (CDS) or speech pathologist. They require an analysis of the child's grammatical structures as used in spontaneous speech. They are included for the interest of the teacher and to help facilitate understanding between the teacher and the CDS consultant when they are planning for the child's communication needs. The teacher and the CDS can work together using the results of this Language Assessment to devise classroom communication activities appropriate to the needs of the children.

How To Use It

As mentioned before, this tool is made up of three separate sections:

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[1] This tool is designed for use by speech pathologists or communication disorders specialists for an in-depth investigation of the child's communication. Hendrick, D. L., Prather, L., & Tobin A. Sequenced Inventory of Communication Development, University of Washington Press, Seattle, 1975.

1. Receptive Language Items

2. Expressive Language Items which are assessed in a testing situation, and

3. Expressive Language Items which are scored following the combined observations of a classroom teacher and a CDS where necessary.

In order to ascertain whether a child has developed the necessary basic skills for continued normal language development, it is important to assess all three areas. However, as indicated on the form by "CDS assessment items," certain items require extensive language samples and analysis of the parts of speech used. For teachers with questions about children's use of these forms, consultation with a communication disorders specialist is recommended.

However, for the majority of the items presented, this assessment does not require specialized measurement systems. It can be carried out within small academic or group settings. Familiarity with assessment items, fluency in presentation and scoring, and maintenance of a "game-like" atmosphere were found to be an important part of gaining a valid measurement of children's maximum level of performance.

Items presented within each of the sections are not meant to be assessed at one time, but rather can be presented over a period of time (several days) according to the classroom teacher's perception of the children's ability to continue to respond at their level of maximum capability. For example, color awareness may be tested on three different days to achieve the criterion level of three out of three correct, or the expressive use of prepositions may be tested on separate trial days.

Suggested Scoring Procedures

Two forms of the assessment items are presented in order to provide classroom teachers with some freedom in selecting whichever format is found to be most useful, or in employing all three, if they wish, for different purposes.

Format A (Expressive and Receptive "test booklets"). In this format items are presented in the three separate sections or "test booklets" described above and are listed in chronological order below age level for the normal rate of acquisition. Four columns appear to the right of each assessment item.

Two possible uses for this format are:

1. An individual child's assessment record which documents his/her progressive acquisition of language skills.

In this format, the time of year that the assessment was carried out is entered at the top of the column. Items which the child passes are indicated by a check mark and items which are failed are indicated by "0." This provides teachers with information about skills gained or lost over a period of months and presents a visual picture of the child's progress.

2. A classroom overview of all the children which provides "at a glance" information about: (a) which children have been assessed in what areas; and (b) which children require special programming and in what areas of language development.

Check marks and circles can be followed by a nummerical indication of whether the child performed to criterion level or not. For example, a circle followed by "1/3" would indicate that the child passed one out of three trials but failed to meet the specified criterion of three out of three correct responses. Children often gain increasing reliability in responding to newly learned concepts; this scoring procedure documents such progress.

In this format the columns are subdivided so that an entire classroom is presented on one sheet of assessment items. Items passed are again indicated by a check mark and items failed by a "0." This format facilitates knowing where all the children in a classroom are following one assessment period. This information was found useful in providing head teachers with an overview from which to work with aides or volunteers, etc., to plan for individual children's programs and to subdivide a classroom of children for academic and small language group activities.

Format B (Individual Pupil Profile). In this format all assessment items are presented on one sheet under the appropriate column headings (Receptive Language; Expressive Lanague, test items; Expressive Language, observation items). The blocks form a vertical sequence and are divided into four month developmental periods for the normal rate of acquisition.

Items passed by an individual child are highlighted by a colored felt marker. Items failed are left in their original print. Subsequent testings are highlighted in a different color felt marker. This format presents a highly readable picture of the child's overall language development. Marked discrepancies, for example, between a child's receptive and expressive language development (such as a year or more of difference between receptive and expressive language functional level) become immediately visible. However, gross discrepancies between the two indicate the need for intensive intervention. In addition, this format can support such teacher observations as, "This four-year-old child talks like a two-year-old." On the basis of this more specific information about the nature of this "two-year-old talk," teachers can begin to plan activities which facilitate the learning of the next items on the language development sequence.

RECEPTIVE LANGUAGE

4 MONTHS

Responds to sound with *startle* (two out of two)

8 MONTHS

Looks or smiles in response to, "Hi, there." Turns to sound (two out of two)

12 MONTHS

Turns and looks in response to, "Look here." (two out of two correct)

Comes in response to, "Come here" plus *hold out hands.* (two out of two correct)

16 MONTHS

Comes in response to, "Come here" no gestural cue. (two out of two correct)

Indicates awareness by *looking/showing* in response to, "Show me" and presentation of familiar:

toys (two correct responses) — — — — — — —
family members (two correct responses) — — — — — — —
clothing (two correct responses) — — — — — — —
action words (two correct responses)

20 MONTHS

Responds to, "*Give* it to me" accompanied by *gesture;* by giving object held in hand to teacher (two out of two correct)

Responds to, "*Get* the car" by picking up car placed in front of him/her (two out of two correct)

24 MONTHS

Responds to, "*Give* it to me" (no gestural cue) by giving object to teacher (one instance)

Indicates awareness by *looking/showing* in response to, "Show me" and presentation of familiar household objects. (two correct responses)

Responds by *touching/pointing* to,

"Show me your *eyes,*" — — — — — — —
"Show me your *hair,*" — — — — — — —
"Show me your *mouth,*" — — — — — — —
"Show me your *nose.*" — — — — — — —
(one instance each item)

Responds to, "Put the block *in* the box" by placing block *in* appropriate box when two boxes are presented, one box facing up and one facing down. (three out of three correct)

28 MONTHS

Demonstrates understanding of *quantity* by responding to, "Put *one* block in the box" when six blocks are presented. (one instance)

Demonstrates understanding of *quantity* by responding to, "Put in *all of them.*" (Places five remaining blocks in the box.)

32 MONTHS

Responds to, "Put the block *on* the box" by placing block on the box when two boxes are presented, one box facing up and one facing down. (three out of three correct)

Responds correctly to, "Show me the *big* (object)." (three out of three sets of objects correct)

Responds correctly to, "Show me the *little* (object)." (three out of three sets of objects correct)

36 MONTHS

Responds to group games or music activities by participating physically

40 MONTHS

Responds by indicating correct *color* to teacher direction:

"Show me *orange*," — — — — — — — —
"Show me *purple*," — — — — — — — —
"Show me *yellow*," — — — — — — — —
"Show me *green*," — — — — — — — —
"Show me *red*," — — — — — — — —
"Show me *blue*." — — — — — — — —

(three out of three correct for each color)

Responds to commands involving two *objects*, e.g., "Give me the block and the car." (three out of three correct)

Responds correctly to, "Show me the *hard* one." (three out of three correct)

Responds correctly to, "Show me the *soft* one." (three out of three correct)

44 MONTHS

Responds to commands involving *two actions* and *two objects*, e.g., "Put the cup on the floor and give me the ball." (three out of three correct)

Responds to teacher direction, e.g., "Put the block *under* the box" by placing block under the box. (three out of three correct)

Responds to teacher direction, e.g., "Put the block *beside* the box" by placing block beside the box. (three out of three correct)

Chooses *penny* from four different coins. (two out of two correct)

Responds appropriately to, "Give me *three* blocks" when ten blocks are presented. (one instance)

Responds to command involving *three actions* and *three objects*, e.g., "Put the cup on the floor, give me the ball, and put the doll in your lap." (one out of three correct)

48 + MONTHS

Responds correctly to, "Show me the rough one." (three out of three correct)

Responds correctly to, "Show me the smooth one." (three out of three correct)

Chooses *nickel* from 4 different coins. (two out of two correct)

Chooses *dime* from four different coins. (two out of two correct)

Responds to commands involving *three actions* and *three objects*, e.g., "Put the cup on the floor, give me the ball, and put the doll in your lap." (three out of three correct)

Receptive Language—to be used in determining the child's level of understanding. Mark (√) for items performed. Mark (0) if not performed.

EXPRESSIVE LANGUAGE—TO BE TESTED

4 MONTHS

(See "Expressive Language—To be Observed" section)

8 MONTHS

(See "Expressive Language—To be Observed" section)

12 MONTHS

Imitates clapping (approximation)

Imitates peek-a-boo

Imitates sounds you make

16 MONTHS

(See Expressive Language--To be Observed section)

20 MONTHS

Imitates *tongue* click
Imitates *cough*
Says, "*Hi*" in response to teacher greeting, "Hi" (one instance)

24 MONTHS

(See "Expressive Language—to be Observed" section)

28 MONTHS

Names known objects in response to teacher verbal, "What's that?" (three out of three correct)

32 MONTHS

Responds by indicating verbally or with head nod (*yes*) to question, "Do you want (desired object)?" (two out of three correct)

Responds by indicating verbally or with head shake (*no*) to question, "Do you want (aversive object)?" (two out of three correct)

Answers function question with *noun* (e.g., "What do you wear on your feet?" "What do you use to cut paper?" "What do you read?") (two out of three correct)

36 MONTHS

Chooses desired object by *naming* it in response to, "Which one do you want?" (one instance)

40 MONTHS

Responds by saying, "*In*" to question, "Where is the block?" (teacher puts block in box) (three out of three correct)

44 MONTHS

Responds by saying, "*On*" to question, "Where is the block?" (Teacher puts block on box) (three out of three correct)

Responds by saying, "*Under*" to question, "Where is the block?" (Teacher puts block under box) (three out of three correct)

Responds by saying, "*Beside*" to question, "Where is the block?" (Teacher puts blocks beside box) (three out of three correct)

Responds with *function verb* to questions, e.g., "What are scissors for?" "What do you do when you're tired?" "What are chairs for?" (three out of three correct)

Responds by saying, "*Two*" to question, "How many (blocks) are there?" (two objects presented) (one instance)

48 + MONTHS

Responds by saying, "*Three*" to question, "How many (blocks) are there?" (three objects presented) (one instance)

Responds by saying, "*Five*" to question, "How many (blocks) are there?" (five objects presented) (one instance)

Expressive Language—to be used in testing child's functional use of **language**. Mark (√) for items performed. Mark (0) for items not performed.

EXPRESSIVE LANGUAGE—TO BE OBSERVED

4 MONTHS

Cries
Cries sound different (hunger, cross, in pain)
Vocalizes when something liked is taken away.
Reaches for objects.[1]
Laughs aloud (one observed instance)

Vocalizes to moving objects or people (one observed instance)

8 MONTHS

Uses different *intonational* patterns (one observed instance)

Uses *vowel sounds* (minimum of two different sounds)

Uses *consonant/vowel sounds* (minimum of two different sounds)

12 MONTHS

16 MONTHS

Uses question *inflection* (one observed instance)

Uses intonational patterns that *sound like sentences* (one observed instance)

20 MONTHS

Spontaneously *imitates* with *inflectional patterns* (one observed instance)

Names object by use of *consistent sound combinations*, e.g., "gook" for cookie (two different combinations)

24 MONTHS

Points to objects wanting teacher to name (one instance)

Names wanted object (one instance)

Responds by saying, "*No No*" when object is taken away (one instance)

Uses two to three word sentences

28 MONTHS

Asks two different *questions* (e.g., "Where's Daddy?" "Can I go?" or "What's that?")

Spontaneously *tells about* immediate experience (one observed instance)

*Spontaneous language includes:
verbal phrases (e.g., "me go") — — — — — — — —
regular plurals (e.g., "dogs"), — — — — — — — —
pronouns as subject (e.g., "I play")

32 MONTHS

Uses 3–4 word phrases

*Uses prepositions (e.g., in, on) ________________
adjectives (e.g., big, hot) — — — — — — —
question form (e.g., can, what) — — — — — — — —
3rd person pronouns (e.g., its, he)

36 MONTHS

Uses three to four word sentences

*Uses verb 'to be' (i.e., I am/ it is)

*Uses adverbs (e.g., very, down)

40 MONTHS

Asks "Why?" questions (minimum of two different instances)

Uses four to five word sentences

*Uses negatives (e.g., don't)

*Uses possessive pronouns (e.g., mine)

*Uses subject verb agreement (e.g., he ran)

*Uses conjunction (e.g., big *and* fat)

*Uses verb 'to be' auxiliary 3rd person (e.g., he is running)

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1. Item from *Bayley Scales of Infant Development* The Psychological Corp., New York, N.Y. 1969

*Assessment items to be scored by Communication Disorders Specialist.

44 MONTHS

(See Expressive Language - to be Tested section)

48 + MONTHS

Asks *how* questions (minimum of two different instances)

Responds appropriately to question, "Hi, how are you?" (one instance)

Uses four to five word sentences

*Uses quantitative words (e.g., many)

*Uses pronouns as objects (e.g., give it to him)

*Uses future tense (e.g., "I *will* go.")

*Uses past tense (e.g., I *went* home.")

*Uses dependent clauses (e.g., The boy who was running fell down.)

*Uses irregular plurals (e.g., men, feet)

Expressive Language—to be used while observing child's functional use of language (√) items. Mark (√) for items observed. Mark (0) if not observed.

INDIVIDUAL PUPIL PROFILE

Pupil: ____________________ Testing date: 1. ____________________

2. ____________________

B.D.: ____________________ 3. ____________________

Teacher: ____________________

Age Level	Receptive Language	Expressive Language to be tested	Expressive Language to be observed
4 months	Responds to sound with *startle*.		*Cries*. *Cries* differentially. *Vocalizes* displeasure. *Laughs* aloud. *Vocalizes* to moving objects or people. *Reaches* for objects.[1]
8 months	*Turns* to sound. *Looks* or smiles in response to, "Hi there."		Uses different *intonational patterns*. Uses *vowel sounds*. Uses *consonant/vowel sounds*.
12 months	*Turns and looks* in response to, "Look here." *Comes* in response to, "Come here." (accompanied by gestures).	Imitates *clapping*. Imitates *peek a boo*. Imitates *sounds* you make.	
16 months	*Comes* in response to, "Come here." (no gestural cue). Responds to specific words by showing what was named: *toys, family members, clothing, action words*.		Uses *question inflection*. Uses intonational patterns that *sound like sentences*.
20 months	Responds to, "*Give* it to me." (accompanied by *gesture*). Responds to, "*Get* the ________."	Says, "*Hi*" in response to teacher greeting, "Hi." Imitates *tongue click*. Imitates *cough*.	Spontaneously *imitates* with *inflection patterns*. Names object by use of *consistent combinations*.
24 months	Responds to, "*Give* it to me." (no gestural cue). Responds to specific words by showing familiar *household items*. Responds by *touching/pointing* to: "Show me your *eyes*," ". . . *hair*," ". . . *mouth*," ". . . *nose*." Responds to, "Put the block *in*."		*Points* to objects wanting teacher to get them. *Names* wanted object. Responds by saying, "*No No*." Uses two to three word sentences

28 months	Demonstrates understanding of quantity by responding to, "Put one __________." Demonstrates understanding of *quantity* by responding to, "Put in *all of them*."	*Names* known objects.	Asks two different *questions.* Spontaneously *tells about* immediate experience *Spontaneous language includes verbs (e.g., me *go*), regular plurals (pronouns as subjects (e.g., *I* play). *(CDS assessment item)
32 months	Responds to, "Put the block *on*." Responds to, "Show me the *big* one."	Responds by indicating verbally or with head nod, "*yes*," to a question. Responds by indicating verbally or with head shakes to a question.	*Uses three to four word phrases* Uses prepositions (e.g., in, out), adj. (e.g., big, hot), question form (e.g., can, what) 3rd person pronouns (e.g., its, he) *(CDS assessment item).
36 months	Responds to group games or music activities by *participating physically*	*Chooses* desired object by *naming* it.	*Uses three to four word sentences* *Uses verb 'to be' (i.e., it *is*), adv. (very, down) *(CDS assessment item).
44 months	Responds to (three different) commands involving *two actions* and *two objects.* Responds to, "Put the block *under*." Responds to, "Put the block *beside*." Responds by choosing *penny.* Responds to, "Give me three blocks." Responds to a command involving *three actions* and *three objects.*	Responds by saying, "*on*" to question. Responds by saying, "*under*" to question. Responds by saying, "*beside*" to question. Responds with *function verb* to questions (i.e., "What are scissors for?"). Responds by saying, "*two*" to question, "how many _____?".	
48 months +	Responds to, "Show me the *rough* one." Responds to, "Show me the *smooth* one." Responds by choosing *nickel.* Responds by choosing *dime.* Responds to (three different) commands involving *three actions, three objects.*	Responds by saying, "*three*" to question, "How many?". Responds by saying, "*five*" to question, "How many?".	Asks *how* questions. Responds appropriately to question, "*Hi*, how are you?" *Uses four to five word sentences* *Uses quantitative words (e.g., *many*), uses pronouns as objects (e.g., give to *him*), future tense (e.g., I *will* go), past tense (e.g., I *went* home), dependent clauses (e.g., The boy *who was running* fell down), irregular plurals (e.g., *men, feet*)

*(CDS assessment item)

1. Item from Bayley Scales of Infant Development. The Psychological Corp. New York, NY.

RECEPTIVE LANGUAGE CHECKLIST

ITEM NO.	DATE PASSED	BEHAVIOR DESCRIPTION	ESTIMATED DEVELOP-MENTAL LEVEL	COMMENT
1		Infant responds reflexively to sudden loud noise.	Zero to one month	
2		Infant alters state or attends to noisemakers.	Zero to one month	
3		Infant responds to human voice.	Zero to one month	
4		Infant smiles in response to human voice, touch, and smile.	One to two months	
5		Infant stops whimpering in response to noisemakers.	One to two months	
6		Infant stops whimpering in response to human voice.	One to two months	
7		Infant looks at person's face when person talks.	One to two months	
8		Infant turns toward sound of voice.	One to two months	
9		Infant discriminates angry tone of voice from soothing voice.	Three to four months	
10		Infant localizes to sound.	Three to four months	

ITEM NO.	DATE PASSED	BEHAVIOR DESCRIPTION	ESTIMATED DEVELOP-MENTAL LEVEL	COMMENT
24		Infant looks at picture pointed to and named.	Ten to eleven months	
25		Infant responds to direction, "Come here."	Eleven to twelve	
26		Infant turns to locate family member when named (e.g., "Mommy") by manager.	Eleven to twelve months	
27		Infant responds to names of familiar toys.	Eleven to twelve months	
28		Infant responds to names of familiar clothing items.	Eleven to twelve months	

EXPRESSIVE LANGUAGE

ITEM NO.	DATE PASSED	BEHAVIOR DESCRIPTION	ESTIMATED DEVELOPMENTAL LEVEL	COMMENT
Initiating Behaviors - Non-verbal				
1		Infant spontaneously smiles.	Two to three months	
2		Infant stops movement to look at familiar manager.	Three to four months	
3		Infant gestures to be picked up.	Four to five months	
4		Infant reaches for desired toy.	Four to five months	
5		Infant reaches and smiles to familiar manager but not to stranger.	Five to six months	

ITEM NO.	DATE PASSED	BEHAVIOR DESCRIPTION	ESTIMATED DEVELOPMENTAL LEVEL	COMMENT
11		Infant looks at image in mirror	Four to five months	
12		Infant usually stops crying in response to human voice.	Four to five months	
13		Infant responds to name being called.	Five to six months	
14		Infant looks for familiar item after seeing it drop to floor.	Five to six months	
15		Infant responds to music.	Six to seven months	
16		Infant looks at people talking to each other.	Seven to eight months	
17		Infant turns to name being called.	Seven to eight months	
18		Infant discriminates parent's voice from stranger's voice.	Eight to nine months	
19		Infant comes to manager when given verbal and gestural cue.	Nine to ten months	
20		Infant understands direction, "Give it to me" accompanied by a gesture.	Nine to ten months	
21		Infant stops activity to word, "No."	Ten to eleven	
22		Infant unwraps object in response to manager's question, "Where is it?"	Ten to eleven months	
23		Infant moves body to music.	Ten to eleven months	

ITEM NO.	DATE PASSED	BEHAVIOR DESCRIPTION	ESTIMATED DEVELOP-MENTAL LEVEL	COMMENT
6		Infant creeps to find familiar manager.	Six to seven months	
7		Infant looks at strangers.	Seven to eight months	
8		Infant uses gestures to signify "no."	Eight to nine months	
9		Infant protects self from frightening occurrences.	Eight to nine months	
10		Infant initiates familiar games.	Ten to eleven months	
11		Infant gives objects to others.	Eleven to twelve months	

Initiating Behaviors - Vocal/Verbal

12		Infant makes noise in throat sounds.	Zero to one month	
13		Infant cries undifferentially.	Zero to one month	
14		Infant vocalizes vowel-like sounds randomly.	Zero to one month	
15		Infant cries differentially.	One to two months	
16		Infant coos and vocalizes when alone.	Two to three months	
17		Infant squeals.	Two to three months	

ITEM NO.	DATE PASSED	BEHAVIOR DESCRIPTION	ESTIMATED DEVELOP-MENTAL LEVEL	COMMENT
18		Infant vocalizes two different sounds.	Two to three months	
19		Infant babbles.	Three to four months	
20		Infant vocalizes displeasure.	Three to four months	
21		Infant uses sounds "p," "b," "m," "k," and "g."	Three to four months	
22		Infant babbles strings of syllables.	Four to five months	
23		Infant laughs during play with toys.	Four to five months	
24		Infant vocalizes to moving objects.	Four to five months	
25		Infant vocalizes to get attention.	Four to five months	
26		Infant vocalizes with a series of four syllables.	Five to six months	
27		Infant vocalizes differently to express feelings.	Five to six months	
28		Infant vocalizes with variation in volume.	Six to seven months	
29		Infant vocalizes with intonation variations.	Six to seven months	
30		Infant uses word-like vocal expressions.	Six to seven months	

ITEM NO.	DATE PASSED	BEHAVIOR DESCRIPTION	ESTIMATED DEVELOPMENTAL LEVEL	COMMENT
31		Infant "sings" to music.	Seven to eight months	
32		Infant babbles sound like sentences.	Seven to eight months	
33		Infant uses exclamations like, "oh-oh."	Nine to ten months	
34		Infant says, "Mama/Dada."	Nine to ten months	
35		Infant uses consistent sound combinations for words.	Ten to eleven months	
36		Infant uses two words other than, "Mama/Dada."	Eleven to twelve months	
37		Infant talks to toys and people using sentence-like verbal patterns.	Eleven to twelve months	

Imitative Behaviors—Non-verbal

ITEM NO.	DATE PASSED	BEHAVIOR DESCRIPTION	ESTIMATED DEVELOPMENTAL LEVEL	COMMENT
38		Infant occasionally imitates own movements in response to manager's imitation.	Two to four months	
39		Infant imitates gestures that are a part of his/her repertoire.	Four to eight months	
40		Infant imitates peek-a-boo/ pat-a-cake.	Eight to twelve months	
41		Infant shakes rattle in imitation of manager.	Eight to twelve months	
42		Infant waves bye-bye in imitation of manager.	Eight to twelve months	

ITEM NO.	DATE PASSED	BEHAVIOR DESCRIPTION	ESTIMATED DEVELOPMENTAL LEVEL	COMMENT
43		Infant imitates facial expressions.	Eight to twelve months	
44		Infant puts beads in box in imitation of manager.	Eight to twelve months	

Imitative Behaviors—Vocal/Verbal

45		Infant vocalizes own sounds in response to manager's imitation.	Three to four months	
46		Infant attempts to imitate talk with sounds.	Five to six months	
47		Infant imitates sounds and syllables.	Nine to ten months	
48		Infant sometimes tries to imitate new words.	Ten to twelve months	
49		Infant imitates sounds, e.g., smack lips, cough, tongue click.	Ten to twelve months	

ITEM NO.	DATE PASSED	BEHAVIOR DESCRIPTION	ESTIMATED DEVELOPMENTAL LEVEL	COMMENT
Responding Behaviors - Vocal/Verbal				
50		Infant coos and gurgles in response to talking.	One to two months	
51		Infant laughs in response to talking and play.	Two to three months	
52		Infant vocalizes own sounds in response to manager's imitations.	Three to four months	
53		Infant vocalizes vowel-like sounds or babbles in response to talking.	Three to four months	
54		Infant babbles to manager approaching and talking.	Four to five months	
55		Infant vocalizes in response to manager calling name.	Six to seven months	
56		Infant uses sentence-like vocalizations in response to talking.	Eleven to twelve months	

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Commercially Available Language Curricula

Introduction

Many professionals have developed language curricula for the retarded. A number of individuals across the country are also currently engaged in language curricula development. Below is a compilation of just a few curricula that are easily accessible to the public and are relevant for use with the severely/profoundly handicapped population. This list does not include language curricula imbedded in a total school curriculum program. It is certainly not exhaustive but rather a representative sample. A good source for further information on language curricula available and also curricula currently being developed is Macalyne Fristoe's edited book of Language Intervention Systems for the Retarded.

A Language Intervention Program for Developmentally Young Children
Diane Bricker, Laura Dennison, William Bricker
University of Miami
Mailman Center for Child Development
Post Office Box 52006
Miami, Florida 33152

This program was developed for a range of individuals from those with little or no language skills to the pupil who produces three-word phrases. The program stresses training in six areas: (1) cognitive prerequisites to language; (2) behavior management; (3) functional use of objects; (4) imitation; (5) comprehension; a and, (6) production. A sequence of behaviors is specified within a sensorimotor lattice structure based on Piagetian theory. The program is not highly structured but offers instructional strategies for management. Individual probes are used as a measurement procedure. Training occurs in natural and appropriate settings to facilitate generalization of skills.

Approximate cost $5.00

Non-Speech Language Initiation Program (Non-Slip)
Joseph Carrier and Tim Peak
H & H Enterprises
Box 3342
Lawrence, Kansas 66044

This is a highly structured expressive language training program. The child uses pieces of masonite cut into various shapes rather than oral language. It is intended as a training program to teach conceptual rules for correct linguistic sequences in sentence formation rather than a circumscribed set of functional communicative responses. The child needs some vision and the ability to point for entry into the program. The program ends with production of seven-word, grammatically correct sentences.

Approximate cost $160.00-220.00

Functional Speech and Language Training for the Severely Handicapped
D. Guess, W. Sailor, D. Baer
H & H Enterprises, Inc. 1976
Box 3342
Lawrence, Kansas 66044

This highly structured program utilizes applies behavioral methods to teach functional speech and language skills. The expressive mode is strongly emphasized. The program is written out in 60 training steps with a criteria for performance established for each objective. There are four parts to the book. The program can be run by professionals and aides and all should be familiar with behavioral strategies.

Approximate cost per part: $8.00

Monterey Language Program
Burl Gray and Bruce Ryan
Monterey Learning Systems
900 Welch Road
Palo Alto, California 94304

This highly structured expressive language program trains syntactical structures in a small step sequence format. The child is taught grammatical forms which are then chained together. The entire 40 lesson program is written out in detail. Each lesson is broken into approximately 25 steps. The teaching dialogue is in script form. Entry behavior for the child is that s/he be able to vocalize. The program can be purchased only by persons who have taken training and are certified by the distributor.

Approximate cost: $150.00

Bliss Symbol Communication Training Program for Communicatively Handicapped Children
BlisSymbolics Communication Foundation
862 Eglinton Avenue East
Toronto, Ontario, Canada M462L1

Bliss Symbols are simple line drawings which represent concepts as opposed to single words. This program is designed for the non-oral child as an alternative expressive mode which requires a pointing response using a communication board. It is suitable for the physically handicapped child who has basic attending skills and a desire to communicate, and who is functioning at a two-year level with receptive vocabulary. The program ends with the child having the ability to answer questions, converse and communicate his/her basic needs through pointing to appropriate symbols. The program is moderately structured with teaching strategies suggested.

Approximate cost: $27.50

Emerging Language
John Hatten, Tracy Gorman, and Carol Lent
Communication Skill Builders
Post Office Box 6081D
Tuscon, Arizona 85716

This program is designed to be used by professional speech clinicians. The major emphasis is expressive language development which is written with behavioral objectives and utilizes interactive play as the vehicle for training. The developmental order of the syntax presented follows Laura Lee's Developmental Sentence Analysis. The program begins at the one-word level and continues through to the stabilization of formal sentences and various forms of transformational grammer.

Approximate cost: $8.95

Handbook of the Los Angeles County
Language Based Autism Program
R. Hirsch, F. Needles, and B. Sivertsen
L.A. County Special Education Division
Twain Administrative Unit
15516 South Doty Avenue
Laundale, California 90260

This program was designed for use with children with severe central language disorders. It is intended as a beginning language sequence, teaches a core comprehension and uses vocabulary to include nouns, verbs, adjectives and prepositions. The vocabulary chosen can then function as different semantic components. The program also includes a cognitive sequence. Instruction is also given for use of total communication. Assessment criteria is given for each objective and each program is written behaviorally.

Approximate cost: Free

Ready, Set, Go
D. Horstmeir, J. MacDonald, Y. Gillette
The Nisonger Center
Ohio State University

The content of this program is based on Piaget and the semantic concepts of Bloom and Brown. Although receptive and expressive language skills are taught, there is a strong emphasis on generalizing communication skills into the child's natural environment. This program was also designed to be used with parents. The program is moderately structured and provides daily data forms along with training and generalization probes to see if a child can move on to the next sequence.

Approximate cost: $6.00

Language Acquisition Program for the Severely Retarded
Louise Kent
Research Press
2612 North Mathis Avenue
Champaign, Illinois 61820

This highly structured program has each objective written in script format with extensive teaching strategies described. The entry requirements are that the child sit unsupported and have some degree of head control. Receptive/expressive language is taught as well as motor imitation. The program has an extensive section on signing and total communication for the deaf or non-oral child. The program ends at the two and three word functional sentence level. Compliance or attending behaviors are also taught in the pre-verbal section of the book.

Approximate cost: $5.95

Initial Expressive Language Program
J. McDonnell, H. Fredericks, and D. Grove
Teaching Research
Monmouth, Oregon 97361

This program sets up script and teaching strategies to teach expressive language through seven learning phases: establishment of eye contact, motor imitation, motor and speech sound imitation, imitation of consonants and vowels, imitation of consonant-vowel chains, imitation of words, naming objects and action words, and imitation of word chain. It can be used by anyone who will study and practice the manual. Data of pupil progress is charted.

Approximate cost: $25.00

An Ontogenic Language Teaching Strategy for Retarded Children
Jon F. Miller and Dave Yoder
Described in Schiefelbusch, R. and Lloyd, L. (Eds.)

Language Perspectives--Acquisition, Retardation, Intervention
Baltimore: University Park Press, 1974

This program is based upon a semantic and cognitive model. Semantic concepts are taught as they would naturally occur in the environment. The program offers instructional strategies and no measurement system is specified. Behavioral prerequisites serve as a means of measuring individual competency. Only professionals with a sound background in normal language development could utilize this program.

Approximate cost (cost of book): $14.50

A Behavioral-Psycholinguistic Approach to Language Training
Kathleen Stremel-Campbell and Carol Waryas
Project MESH
320 N. 29th Street
Parsons, Kansas

The procedures are behavioral and the content is developmental psycholinguistic. The training modes lead to comprehension, imitation and production of sentences. The child needs 25 receptive nouns, 10 expressive nouns, 80% approximate imitation of a set of 10 consonants and 5 vowels for entry into the program, as well as primary attending behaviors. About 50% of the program is written in detailed script form with a flow chart format of linguistic objectives. Terminal level is production of modifier + noun + pronoun + auxiliary + verbing + preposition + modifier + noun in spontaneous speech samples. This program is to be used by professionals or highly trained paraprofessionals. The program is adaptable for signing and written programs can be used with nonverbal children.

Approximate cost: $4.00

Decision Points for Modification of Language Curricula

Very few language curricula can be used exclusively without some modification. All persons are individuals and therefore have different needs and respond differently to various teaching procedures. However, many language curricula do provide an excellent base and strategies for teaching language skills. If one needs to and is aware of ways to adapt of modify existing curricula, one can better use the curricula to teach language skills to the severely/profoundly handicapped.

Four decision points we consider when modifying curricula are: (1) Objectives: (2) Behavior of Pupil; (3) Antecedent Events; (4) Consequences.

Objectives

If a pupil is not succeeding in a program, one area to look at is the objective of that program. We feel that the language objective should first be functional. It should not only be useful for the pupil but should be agreed upon by both teachers and parents. Secondly, the objective should be developmentally appropriate. For example, it may not be appropriate to teach a twelve-year-old to babble; nor would it be developmentally appropriate to teach two-word phrases before an individual can say one word. It is important to be certain that the objective of the program is appropriate in all aspects for the individual for whom the program is intended.

Behavior

Most language curricula will specify the behavior or response the learner is to make. Depending upon the structure of the program, the response may be stated either in behavioral terms or in a more general way. We have found it desirable to make certain that the behavior selected is something a pupil can do, at least sometimes. Often this may mean that the behavior specified in the curriculum needs to be broken down or "sliced back" until a level is found where pupil success occurs occasionally. For example, if the behavior specified is for the pupil to imitate the sign for "more" within five seconds of the cue and the pupil emits no correct responses, it may be good to consider changing the behavior specified. One way to do this might be to accept an approximation of the behavior, such as bringing hands together, as a correct response. This "slicing back" may enable the pupil to achieve a level of success that was not present before.

Antecedent Events

No language curriculum could possibly enumerate the variety of materials or cues that can be used to help a pupil perform the desired behavior. A lack of success in a program may be due to materials that are boring, or perhaps materials that are too abstract, e.g., if a pupil is expected to respond to the names of pictures, it may be easier to have him/her respond to objects instead. Often, it may be desirable to change what you say. For example, if you are expecting a verbal response to the question "What is it?" it may be desirable to utilize a prompt before the question, e.g., "car," "What is it?" Another way to change an antecedent event might be to change what you do. Some pupils may not respond independently to a direction. We find it helpful to utilize models, prompts, or physical assists as warranted to get the behavior to occur. Our assistance is gradually faded out so the pupil is then responding independently. Antecedent events, then, can be changed by altering materials, changing what you say, or changing what you do.

Consequent Events

The last decision point that may need to be modified on a curriculum is the consequent events specified for correct and error behavior. In order for correct responses to occur, reinforcers may need to be changed to meet individual desires or to lessen the probability of satiation. So that correct responses can be generalized, schedules and types of reinforcement may need to be considered. The type of consequent event that is specified in the curriculum for error behavior may also need to be changed. There are a number of consequences for error behavior, e.g., ignoring, simple correction, over-correction, punishment, etc., and one strategy may work better for a pupil than another.

Conclusions

There are a number of language curricula available that can be used with the severely/profoundly handicapped. However, not all curricula will meet each individual's needs. If one is familiar with decision points on which to modify curricula, i.e., the objectives, behavior, antecedent events, and consequent events, language curricula can be modified in order to be useful in teaching language skills to the severely/profoundly handicapped.

LANGUAGE CURRICULA CHECKLIST

	Trains Pre-requisite Behaviors	Functional Play	Receptive Language	1. word understanding	2. understands 2/3 semantic relations	Motor Imitation	Expressive Language	1. sound imitation	2. functional vocabulary	3. phrases	4. sentence structure	Alternative Systems	1. total communication	2. communication boards	3. other symbol system	Format	1. structure program	2. instructional strategies	3. measurement procedures
Language Intervention Program for Developmentally Young Children. Bricker, D., Dennison, L., & Bricker, W.	X	X	X	X	X	X	X	X	X	X								X	X
Non-speech Language Initiation Program. Carrier, J., & Peak, T.	X		X	X	X	X	X				X	X			X		X		X
Functional Speech and Language Training for the Severely Handicapped. Guess, D., Sailor, W., & Baer, D.	X		X	X		X	X	X	X	X							X		X
Monterey Language Program. Gray, B., & Ryan, B.			X	X			X	X	X	X	X						X		X
Bliss Symbol Communication Training Program for Communicatively Handicapped Children. Blissymbolics Communication Foundation			X	X			X		X			X		X	X			X	X
Emerging Language. Hatten, J., Gorman, T., & Lent, C.							X		X	X	X							X	X
Language Based Autism Program. Hirsch, R., Needles, F., & Siversten, B.	X		X	X	X	X	X	X	X			X	X				X		X
Ready, Set, Go—Talk to Me. Hoistmeier, D., MacDonald, J., & Gillette, Y.	X	X	X	X	X	X	X	X	X	X								X	X
Language Acquisition Program for the Retarded or Multiply Handicapped. Kent, L.	X		X	X	X	X	X	X	X	X		X	X				X		X
Initial Expressive Language Program. McDonnell, J., Fedricks, H., & Grove, D.	X						X	X	X	X							X		X
An Ontogenic Language Teaching Strategy for Retarded Children. Miller, J., & Yoder, D.		X	X	X	X		X		X	X								X	X
A Behavioral-Psycholinguistic Training Approach to Language Training. Stremel-Campbell, K., & Waryas, C.	X		X	X	X		X		X	X	X	X	X	X				X	X

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Considerations for Selecting Alternative Communication Systems

Introduction

There are individuals within the severely/profoundly handicapped population who do not develop verbal speech and do not respond to traditional speech therapy procedures for oral language. However, upon systematic observation, many of these individuals do communicate with their environment in a rudimentary manner. They may display fleeting moments of eye contact, reach for wanted objects, or push others away to signify "no." Although these are communicative behaviors, the responses are not specific, are not communicative to everyone, and are not found to occur consistently. A review of the literature has shown that many professionals have had success utilizing alternate forms of communication with severely/profoundly handicapped persons. Bricker (1972), Miller and Miller (1973), Creedon (1973), Topper (1975), Richardson (1975), Kopchick, Rumbach, and Smilouitz (1975), Grinnel, Detamore and Lipke (1976), Fulwiler and Fouts (1976), Schaeffer, Kollinzos, Musil, McDowell (1976), Stimel-Campbell K., Cantiell, D., and Halle, J. (1977) have all reported the successful use of sign and gestural language in language development programs with moderate to profoundly handicapped individuals who are not hearing-impaired. D. Harris-Vanderheiden, W. Brown, P. Mackenzie, S. Reinen, and C. Scheibel (1975) and Harris-Vanderheiden (1975) add support for the use of Bliss symbols with severely mentally handicapped persons. Both Carrier (1974) and McLean, L., and J. McLean (1974) showed acquisition of language skills in non-verbal severely/profoundly handicapped children and non-verbal autistic children using masonite and plywood word symbols.

Everyone has the right to be able to communicate their needs, desires, and feelings to their fullest potential; to exclude a person from developing a more specific and consistent form of communication because of the lack of verbal speech would be an injustice. The studies mentioned above have shown that severely/profoundly handicapped individuals can learn to communicate via an alternate method. Speculations on reasons for success are varied. Developmentally, infants utilize non-verbal ways to communicate before they use words. Utilizing a gestural mode to communicate, i.e., pointing, signing, or manipulating symbols, may be a developmental step in the progression to speech. Another reason for communication improvement may be that certain severely/profoundly handicapped individuals learn skills more easily when more than one sense modality is utilized. For example, when teaching a sign via total communication, the pupil will not only hear the word, but has an opportunity to see and feel the word as well. It is easier to prompt a signing or pointing response than it is to physically manipulate voicing or articulatory movement. Also, most alternate communication methods have the added advantage of being static. A word is said and gone while a picture, sign, or other symbol, can be exposed until it is learned. A fourth reason for success may be due to an associative relationship, with many alternative communication systems resembling their concrete referents. For example, the sign "ball" is made with two hands in a claw-like position as though the hands were holding on to a ball and turning it. The Bliss symbol for "home" is like an end view of a house--a rectangle with a triangle on top. Pictures or photographs are visual representations of the actual object. Although the reasons for success in utilizing an alternative communication system are important, it is just as important to know that employing such a method will enable many non-communicative individuals to communicate more fully with their environment.

Selecting An Alternative Communication System

There are no specific criteria to use when considering selection of an alternative communication system. However, the following factors should be taken into account.

Age of Pupil. As a child gets older the chances of acquiring oral language diminish. If a child uses few speech sounds and is beyond the age of six, the chances of acquiring speech are small. At this time it may be appropriate to select an alternative communication system so the child has some way to communicate with others. This should not preclude work on oral expressive production, but all involved should be encouraged to try an alternative system. The reverse is also true. If a child is three (or younger) and is not communicating verbally, it doesn't mean that one cannot implement an alternative communication system.

Use of Gesture. If a child initiates or responds to others by gesturing, he or she is communicating with others, even in the absence of any vocalization. This use of gestural communication might be a base with which to build a more sophisticated communication system utilizing an alternative mode.

Use of Spontaneous Vocalization. If the child spontaneously produces few vocal sounds and there is little variety in the sounds made, it may be helpful to consider an alternative communication system.

Physical Production of Speech is Laborious. If a child's oral or breathing mechanism is inadequate for speech production due to cerebral palsy, dysarthria, or apraxia, an alternate communication system may be viable. If cerebral palsy,affects almost all motoric ability, especially in the hands or arms, it would be more appropriate to use a communication device that is dependent upon a simple voluntary response, such as pointing, rather than signing or manipulating geometric forms.

Previous Speech and Language Records. A number of severely handicapped children have spent many hours involved in oral speech and language training. If intensive therapy has yielded few gains, it might be appropriate to select an alternative communication method.

Receptive Language Skills at a Higher Developmental Level Than Expressive Language Skill. If a child understands more than s/he says and uses few speech sounds, s/he may be a good candidate for an alternative communication system.

Verbal Imitation Skills Poor or Non-existent. Imitation of sounds, tongue, lip, or other facial movements are an important aspect of acquiring speech. If a child cannot imitate oral movements, but can imitate manual movements, it may be appropriate to consider signing or another communication system.

Whatever the alternative communication system chosen, it needs to be flexible enough to allow for the child's changing communication needs. If an individual points to pictures as a means of communication and it is determined that more communication could take place if Bliss symbols were used, then the switch should be made. Any system chosen should be acceptable to the individual's parents, teachers, and other with whom s/he will communicate. There needs to be numerous opportunities for practice, generalization and reinforcement.

Case Studies

At the Experimental Education Unit of the Child Development and Mental Retardation Center located on the University of Washington campus, a number of pupils communicate via an alternate method. Meg, a profoundly handicapped girl, was 11 years old, and had always been non-verbal except for making a few vocal noises. After assessment, the communication disorders specialist (CDS) found that Meg responded best to directions and social greetings when they were accompanied by gestures. Meg was also observed to reach or gesture for wanted objects. After discussion with Meg's teacher and parents, a total communication program was initiated. The first sign taught to Meg was the sign for "eat" which was chosen because Meg's mother stated that eating was Meg's most enjoyable activity. The program was run during snack time. Meg acquired the sign quickly and was actually initiating with the sign after twenty sessions. She now has six signs in her vocabulary.

Mary is a severely handicapped non-verbal adult. Four years ago she was taught 21 signs. Although Mary learned these signs easily, she never initiated communication with them. When Mary entered the EEU, a picture form of communication was started in which Mary was taught to communicate with others by pointing to pictures attached to a metal ring. Mary not only learned this skill quickly, but generalized and spontaneously used this type of communication with other people and in different settings. Now Mary is acquiring a sight word vocabulary and soon she will be communicating to others via the written word.

Otto is eleven years old and non-compliant. He communicates a great deal verbally but years of speech therapy have not improved his articulation. Otto spontaneously uses few initial consonant sounds and vowels, no final consonant sounds, and has difficulty imitating oral movements. His receptive skills are higher than his expressive skills. Otto also knows how to read. He has a large sight word vocabulary and reading is one of his favorite past-times. Because Otto was so unintelligible, a communication book was developed for him. It is color coded and divided into eleven different categories; e.g., people, things to eat, things to play with, etc. When Otto wants to communicate, he turns to a category and looks and points to the words that convey what he wants to say. Talking clearly is still strongly emphasized and required when Otto uses his book. After his communication book was introduced, Otto's teachers discovered that he uses two- and three-word phrases and has a lot to say! Otto has become an enjoyable person to have a conversation with, and his non-compliant behavior is diminishing.

Using Symbols

Although there are no children at the EEU communicating with Bliss symbols or geometric forms, these are two other alternate methods to consider. Bliss symbolics are a symbol system developed by Charles Bliss in 1942. The symbol combinations frequently represent more than one word and are often used to represent whole ideas. For some individuals, the symbols may be easier to understand than written words. Because the symbols often represent ideas and are small, they communicate more than pictures. Shirley McNaughton first used these symbols with cerebral palsied individuals. The symbols have also been used with severely mentally handicapped individuals. For a more detailed explanation of Bliss symbolics and their use with severely handicapped individuals, read Non-Vocal Communication Techniques and Aids for the Severely Physically Handicapped by Greg Vanderheiden and Kate Grilley.

The Non-Speech Language Initiation Program (Non-Slip) (Carrier and Peak, 1975) consists of pieces of masonite cut to various shapes to represent words. It's inception was due to the encouraging work of Premack (1970, 1971; Premack and Premack, 1972, 1974). Non-Slip is a programmed training procedure that teaches conceptual skills necessary for linguistic communication rather than a set of "functional" communicative responses. Carrier (1976) states that "some specifically taught responses might be viewed as surrealistic on the surface (e.g., the cat is sitting on the car), but these same responses serve to teach the child critical tactics for rule acquisition and thus serve an invaluable long-term function." Thus Non-Slip teaches "tactics" for acquiring communication rather than teaching functional communication responses. Carrier (1976) reports the success of Non-Slip with non-verbal severely/profoundly handicapped individuals. Utilizing geometric forms for communication provides the extra advantage of tactile awareness, but the disadvantage of having to carry the forms around.

Summary

Unfortunately, not all severely/profoundly handicapped individuals will acquire functional oral language. However, alternate forms of communication are quickly gaining acceptance as a viable way to communicate with others. No longer is it thought unreasonable to utilize sign language with hearing individuals or picture or word books with ambulatory people. It is the right of every individual to be able to communicate to his/her highest potential. Sign language, word and picture books, Bliss symbols and geometric forms are making it possible for severely/profoundly handicapped people to communicate with their environment.

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Implementation of Communication and Language Programs

Background

The importance of teaching functional communication skills to the severely/profoundly handicapped population cannot be overemphasized. Being able to communicate more effectively allows this special population to convey their wants, needs, and feelings and promote more appropriate social interactions. Rieke (1974) points out that there needs to be a distinction made between communication behaviors and language behaviors. Communication is an interaction among people that involves an exchange of information, feelings or ideas. In a communication model, there is an initiator of communication and a receiver. Individuals engaged in this interchange do not communicate by only verbal or written means. Nonverbal behaviors, such as facial expressions or gestures, play an extremely important role in the communication process.

Language behaviors, then, are the symbol systems that are used in communication. With the recent success in using alternate systems with the severely/profoundly handicapped, language need not consist of a verbal symbol system, but may use sign language, graphic symbols, Bliss symbols, or word or picture boards. As an individual has positive communication experiences, it is hoped that language skills will continue to develop. Keeping this in mind, we first need to teach the severely/profoundly handicapped population to be communicators. Then we need to teach them a refined symbol system, or language, that enables their communication to be even more functional.

Communication Development

Communication occurs in a developmental sequence. The first type of communication displayed by an infant is nonverbal communication. In the severely/profoundly handicapped population we need to be particularly cognizant of nonverbal behaviors. Take time to notice if an individual turns in the direction of voices, smiles, looks, or reaches for desired objects. All of these nonverbal behaviors are a means of communication. Very often, a child who is said to have limited language skills may be using a variety of these type of behaviors to communicate with others.

Vocal behaviors, such as cooing, playing with sounds, and using inflectional and intonational patterns occur next in the developmental sequence. At about one year, a child begins to use words; at eighteen months, two-word combinations begin to appear. By the time a child is three and as s/he gets older, sentences occur and become more and more refined. Nonverbal behaviors play an important role in the communication process throughout the development of vocal and verbal behaviors. Communication is a mixture of the two.

Communication Model

Jane Rieke and the staff of the Communications Program, Model Preschool Center for Handicapped Children at the Experimental Education Unit, Child Development and Mental Retardation Center, located on the University of Washington campus have developed a communication model to assist teachers working with young children. Although this model is used successfully with mildly handicapped children, it has relevance to teachers and communication disorders specialists working with a severely/ profoundly handicapped population.

Communication Behaviors

Initiating Behaviors

There are two types of communication behaviors: initiating behaviors and responding behaviors. Initiating behaviors are nonverbal or verbal behaviors used to gain the attention of another person. Rieke (1974) lists six reasons why an individual might initiate communication:

1. call for attention
2. make a comment
3. ask for
4. ask about
5. explain
6. tell about

Examples of nonverbal initiating behaviors might be looking, pointing, touching, smiling, frowning, or reaching. Vocal initiating behaviors might include sighing, calling, or exclaiming. A child might initiate with words by saying, "Look;" with phrases by saying, "Want milk;" or with sentences by saying, "My trike is red."

Responding Behaviors

Responding behaviors occur because of a preceding action or event. Examples of nonverbal responding behaviors might be looking, smiling, nodding, coming, getting, shrugging, touching, or pointing. Vocal and verbal responding behaviors may be the same as initiating behaviors but differ because they are in response to a preceding stimilus. Both initiating and responding behaviors make up the communication process.

Being Aware of Existing Communication Behaviors

The first step in an instructional procedure is to assess skills. In this case it is important to know how an individual fits into the communication process. Does s/he respond to or initiate communication? Does s/he only do so at certain times? If it is determined that a child does initiate and respond

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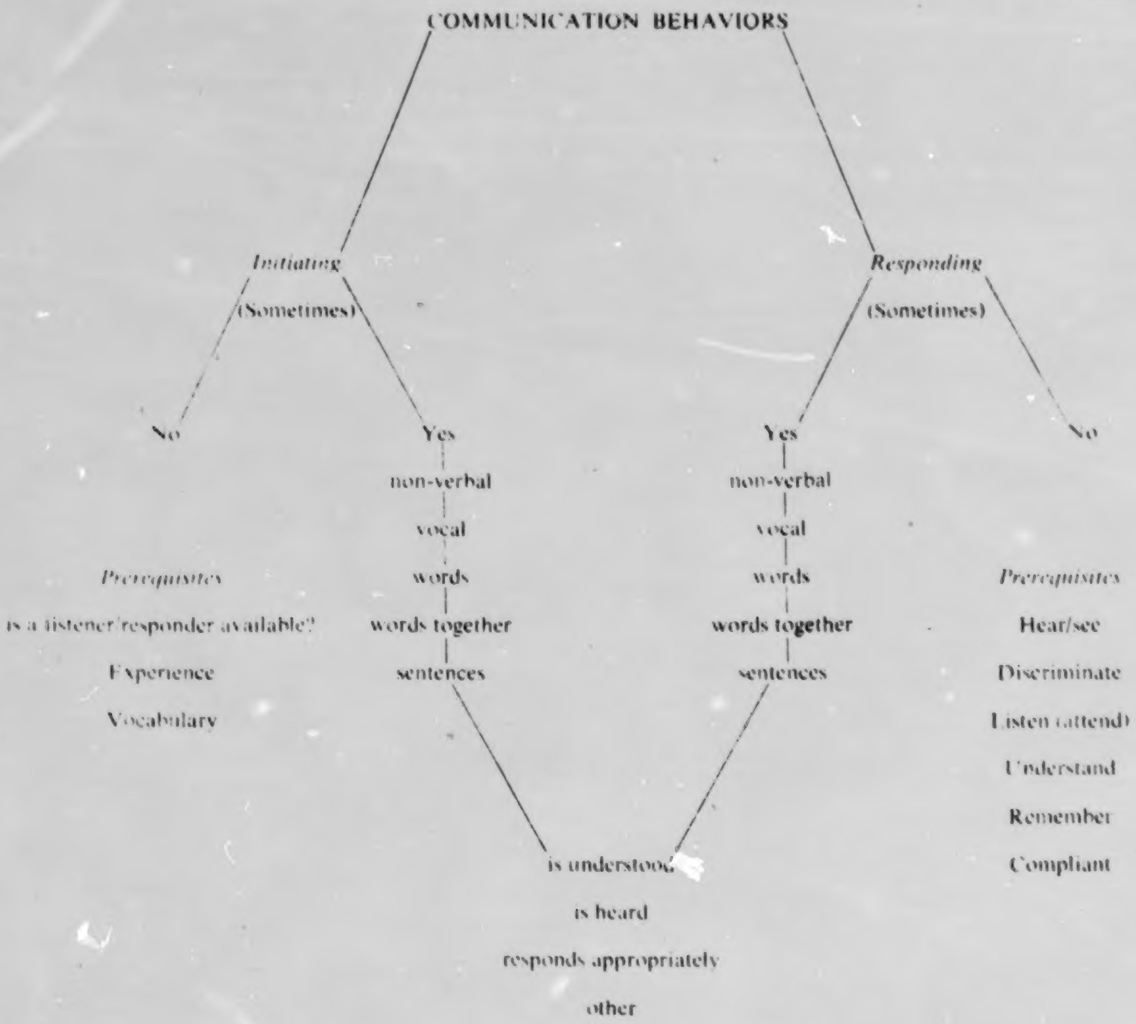
COMMUNICATION MODEL


COMMUNICATION BEHAVIORS
Initiating
(Sometimes)
Responding
(Sometimes)
No
Yes
Yes
No
non-verbal
vocal
words
words together
sentences
non-verbal
vocal
words
words together
sentences
Prerequisites
Is a listener/responder available?
Experience
Vocabulary
Prerequisites
Hear/see
Discriminate
Listen (attend)
Understand
Remember
Compliant
is understood
is heard
responds appropriately
other

communicatively, then we need to see at what level this communication occurs. Does it occur at a nonverbal level? Or does it occur at the word or phrase level? If an individual responds or initiates communication occasionally, then it would be desirable to determine antecedent events or consequences that cause communication to occur and at what developmental level. If an individual is not a communicator, then certain prerequisites need to be looked at. If an individual does not initiate communication, it may be because no one is around to respond or the responder may not be aware of or understand the initiations. An individual also may not initiate if s/he does not have a functional symbol system to communicate with others. If a child does not respond to communication, s/he may have auditory, visual, comprehension, or behavioral problems. These prerequisite behaviors need to be considered before instruction begins.

Objectives

When selecting a communication objective, it is important to remember that communication does not take place in one fifteen minute time slot. Communication can occur throughout the pupil's entire day. If we accept this premise, it is important that all who come in contact with a communicatively handicapped individual be aware of the communication process so that individual's skills and emerging skills can be facilitated and reinforced. Professionals working with the severely/profoundly handicapped population at the Experimental Education Unit function as an interdisciplinary educational team. Team members are aware of each pupil's communication objectives with the communication disorders specialist and classroom teacher working particularly closely together. Few severely/profoundly handicapped pupils work well in a traditional one half to one hour speech and language therapy time outside of the classroom. We have found it useful to implement all communication programs within the classroom setting. This not only works well for short, structured language programs, but alerts us to variables to consider in planning other communication strategies and helps in the generalization of newly learned skills. We are interested in what the child does and can do to communicate naturally in the school environment. By observing the pupil in the classroom and working closely with the teacher, we work together to decide what functional needs the child has to communicate in that setting, the type of communication opportunities already existing, and the times and situations when the teacher can or does interact with the pupil. This information is helpful when establishing language and communication objectives.

Communication in the Classroom

There are a number of different ways to approach teaching communication and language skills. Communication can be facilitated or taught throughout the general classroom day. Often, even though a pupil may be working on an educational objective, facilitating or requiring a communication initiation or response can easily become another objective. This type of procedure is not only useful for current communication behaviors, but is one way to facilitate generalization of newly learned or emerging language skills.

The EEU has devised a method to incorporate a communication objective into a classroom schedule for a specific pupil. The Pupil Program Form is one graphic way of specifying these behaviors. The form is divided into five columns. The first column denotes time that a program is run and the second column specifies activity. In the third column, the learning objective is stated in behavioral terms. The fourth column allows the teacher and CDS to state a communication objective. It may not be appropriate for each educational objective to have a communication objective. For example, if a program is being run that requires a specific response, and a communication interchange is not appropriate, then a communication objective should not be stated. Tentative strategies to facilitate communication are written in the fifth column.

One of the best times of the day to facilitate communication with the child is during the transition periods between planned classroom activities. At the bottom of the form is a section where the teacher and CDS can write the specific communication goal for the daily transition periods. For example, to help a severely involved CP child with good language comprehension to have an opportunity to communicate during transitions, the plan may be that the teacher or aide is to ask the child, "Who do you work with next?" or "Where do you go for snack time?" The child is to respond by pointing to the person or work area where s/he goes for the upcoming activity. Transitions are important periods for any level of communication between staff and pupil and need to be planned for. Using the Pupil Program Form can help the teaching staff systematically plan for both the learning objectives and the communication objectives of each pupil.

Implementing Functional Language Programs in the Classroom

We have found it helpful to teach the acquisition of new language skills in short, structured blocks of time. We utilize a plan sheet and take and chart data. When selecting a language objective, our first criteria is to teach a functional behavior. If the program is a comprehension one, the new behavior being taught should first be useful to the pupil. For example, if the instructional objective is to teach a pupil to give an item named, the items chosen should be functionally useful to the individual's situation so that s/he will have numerous opportunities to use this behavior in the home and school environment. Each skill taught is, of course, dependent on individual needs. It may be appropriate for one pupil to give nuts and bolts on command and for another pupil to give clothing items on command. Expressive programs are chosen so that an individual will be able to communicate his/her needs, wants, and feelings. Very often, the first means of expression chosen is for the pupil to be able to communicate for a highly motivating object or event (e.g., food, toys, swings, hugs, etc.). Hopefully, this shows the pupil that communication can have a pleasurable impact on his/her environment.

The following plan sheet is an example of a functional language program that was established for a pupil at the Experimental Education Unit. Sharon is a profoundly handicapped ten-year-old girl, essentially non-verbal. However, she is very social and

PLAN SHEET NO. 1

PUPIL Sharon DATE January 3, 1977 MANAGERS Scheyer, Rusch

SHORT TERM OBJECTIVE Sharon will sign "eat" within 3 seconds of cue with 80% accuracy for 3 days

LONG TERM OBJECTIVE Given a verbal cue and sign, pupil will sign for 5 desired objects or actions

PROGRAM/ STEP/ SEQUENCE	DATE	MANAGER ACTIVITY: PREPARATION/ PROCEDURE	INCREASE			DECREASE			CRITERIA FOR CHANGE
			BEHAVIOR	RATIO	CONSEQUENCE	BEHAVIOR	RATIO	CONSEQUENCE	
signs "eat Snack Program peaches data sheet & pencil	1/4	Mgr. sits in front of S. Mgr. shows food and signs/says eat. 15 trials	S. signs eat within 3 sec. of cue	1:1	Food and verbal praise	1. No response in 3 sec. of cue 2. Movement of hands other than eat sign	1:1	Physically assists S. in signing "eat" & says "eat" & gives snack & praise	80% for 3 days No improvement for 3 days
Same as above	1/7	Mgr. sits in front of S. Mgr. shows food & signs/says "eat." Mgr. holds S. left hand and sign/says "eat" on S. plus gives food. Mgr. holds S. left wrist approx. 2" from mouth and says, "Tell me eat."	S. moves hand toward mouth within 3 sec. of cue	same as above	same as above	same as above	same as above	same as above	same as above
Same as above	1/20	Same procedure as above but hold hand 4" from mouth	same as above	same as above	same as above	same as above	same as above	Ignore	same as above
Same as above	1/31	Same procedure as above but place S. arm in upright position on elbow	same as above	same as above	same as above	same as above	same as above	same as above	same as above
Same as above	2/10	Same procedure but place S. hands down on table	S. signs eat within 3 sec. of cue	same as above	same as above	same as above	same as above	same as above	same as above

communicates nonverbally by smiling and looking. After assessment was completed, it was decided to teach Sharon to communicate with others via sign language. Her teacher mentioned that Sharon liked food very much and that it would be helpful if she could request food items, so the sign for "eat" was chosen as the first sign to teach. We felt this was a functional language behavior for two reasons: when Sharon made the appropriate sign, she got the item she signed for; it was also a behavior that could be used throughout the day.

Sharon not only learned the sign but began to generalize the skill to another manager and different setting and time all by herself! She was receiving food reinforcement for a "sort block task." Upon completion of her sorting, she looked at the food and initiated the sign for "eat" to her teacher.

Strategies to Promote Generalization

Unfortunately, not all severely/profoundly handicapped individuals generalize newly learned communication skills easily. We feel that an individual needs to learn to use behaviors across the following five conditions:

1. With Different People. If a new skill is taught in a one-to-one teaching situation, it is important that a pupil learn to use the new skill with all people. It might be helpful to have all the classroom staff run the same program and to train the parent and other members of the family to run it. Anyone who regularly comes in contact with the pupil could run the program.

2. In Different Settings. If appropriate, move the program to different physical settings where the behavior might be likely to occur. For example, if you have taught a pupil to sign "toilet," s/he needs to learn that there are not only different places to use the toilet, but that if the need arises the "toilet" sign should be made in any room of the house, outside, in the car, etc.

3. At Different Times. A pupil needs to use a newly learned behavior at different times of the day when it is appropriate. For example, if a pupil has learned to make the sign for "eat" during a snack time, s/he also needs to learn that the "eat" sign can be used at breakfast, lunch, and dinner, too.

4. With Different Stimulus Materials and Cues. It is important to vary the use of materials in a teaching situation so a pupil can learn to make the same response to varying materials when appropriate. For example, if a child has been taught the concept of reoccurrence by using the word "more," s/he needs to know that s/he can use it to get more food, more toys, more kisses, etc.

Also, if a pupil is making a response to a specific verbal cue, it's helpful to alter the cues a bit so the pupil can learn to make the same response to slightly different verbalizations. (If a pupil has learned to select objects in response to "Get the ___," it may be helpful to vary the verbal cue, e.g., "Find the ___," "Take the ___," etc.)

5. With Different Schedules of Reinforcement. If a child has been reinforced continuously for a behavior with a primary reinforcer, the schedule of reinforcement should not only be leaned but consistently paired with social praise.

Generalization strategies can be used all at once or in different combinations. We also do not feel it is necessary to wait until a behavior is learned before work on generalization is started. For example, one pupil at the Experimental Education Unit was involved in a look program: The pupil was to look in response to a teacher walking toward her and saying her name. All personnel in the classroom were responsible for running two or three trials so that the pupil had ten opportunities to respond at different times of the day. In this program, strategies for generalization were incorporated with different people, different times, and different settings.

PLAN SHEET NO. 2

PUPIL Michelle DATE 10/75 MANAGERS Crebo and Staff

SHORT TERM OBJECTIVE to respond by looking at adult who approaches and talks to her, 90% of the time

LONG TERM OBJECTIVE to respond to a variety of social stimuli

PROGRAM/ STEP/ SEQUENCE	DATE	MANAGER ACTIVITY: PREPARATION/ PROCEDURE	INCREASE			DECREASE			CRITERIA FOR CHANGE
			BEHAVIOR	RATIO	CONSEQUENCE	BEHAVIOR	RATIO	CONSEQUENCE	
communication randomly throughout the school day	10/6	When standing within 10 feet of Michelle, manager will walk toward Michelle while talking to her	to look at adult within 5 seconds of initiating cue	1:1	praise her, pat her				70% correct 3 consecutive days
record data on wall chart		10 trials per day		no: 1 occurrence	manager goes on about his business				no improvement over 5 consecutive days: change program
	11/10	same as above	same as above	1:1	praise her, tickle her tummy				

Another generalization program was run in a different manner. Gary had learned to name different functional items in a structured one-to-one therapy setting in the classroom. A communication disorders specialist had run the program. After Gary met criteria on the program, his classroom teacher took responsibility for running the program throughout the day. After consultation with the communication disorders specialist, Gary's teacher decided she could arrange for Gary to have five opportunities to respond with his functional words in a data based program; when appropriate, Gary's teacher would arrange a situation so Gary could respond. For example, before lunch she might point to Gary's lunch pail and say, "What do you need?" Gary's response would be to say, "Lunch pail." In this program, generalization occurred across all five conditions.

Summary

Facilitating acquired communication skills and teaching new communication and language behaviors to the severely/profoundly handicapped population may be a complicated process. However, by being aware of and reinforcing existing communication behaviors, setting up strategies to facilitate communication throughout the day, teaching functional language skills, and then utilizing strategies to promote generalization so the newly learned language skill can be an integral part of the communication process, the severely/profoundly handicapped can begin to learn to communicace more effectively and efficiently.

PLAN SHEET

PUPIL Gary DATE ______ MANAGERS Dee

SHORT TERM OBJECTIVE Given a prompt, Gary will verbally request 5 different items or say 5 different words throughout day w/80% accuracy for 3 days

LONG TERM OBJECTIVE Gary will spontaneously initiate for five items without any prompts with 80% accuracy for 3 days

PROGRAM/ STEP/ SEQUENCE	DATE	MANAGER ACTIVITY PREPARATION/ PROCEDURE	INCREASE			DECREASE			CRITERIA FOR CHANGE
			BEHAVIOR	RATIO	CONSEQUENCE	BEHAVIOR	RATIO	CONSEQUENCE	
During day coat bus spoon label fork soap record lunch box envelope Hi bye nut bolt cookie bathroom PE sandwich milk apple orange		Mgr. wears wrist counter during entire day. Mgr. sets up 5 situations so G. can either ask for or say name of item on list. (ex. standing in front of bus mgr. might say "what is that, Gary?")	asks for or says name w/in 3 sec. of cue	1:1	verbal praise	1. No response 2. Says wrong item name	1:1	Show item and say "tell me ____"	80% correct for 3 days No improvement in 3 days change plan

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NONVOCAL COMMUNICATION

Kitty Dorsey

The problem addressed in this workshop session is faced by teachers, clinicians, and parents in trying to develop an effective means of communication in nonvocal children. The nonvocal child is the child for whom speech is not now a functional means of meeting his or her communication needs. This does not necessarily mean that the child has no speech or vocalization at all, nor does it mean that the child may not develop fully functional speech in the future as some of the children will do. In this session it simply refers to the children who are presently severely (and therefore developmentally) handicapped because they are unable to fulfill their communication needs with limited or nonexistent speech abilities.

The author will present an overview of some of the communication alternatives that are used in various places across the country. Some of these alternatives are in the form of materials, some in the form of methods or techniques, and some are merely concepts or ideas. Our children vary in their communication abilities. They vary in other ways as well. These variations make it necessary to become familiar with a wide range of different possible solutions or approaches in order to be able to develop effective communication systems for these widely varying and very individual children. Some of the variables that become important here are: cognitive abilities, specific physical abilities, visual acuity, extent of hearing, mobility, environment, and communication needs.

As we begin to consider different means of providing communication for the nonvocal child, it is important to discuss what is meant by "communication." A very important point to remember is that communication cannot take place within just one person. There must be a listener or reactor. When developing communication aids for children one must affect the environment in which the child lives if communication is to take place. Communication is a function that takes place among persons who group themselves together to form a community. The author wants to emphasize the relationship of "communicate" to the concept of community. We suspect that many of the communication problems of severely involved children stem from the fact that their community does not interact with them. Because they cannot talk, nonvocal children often find themselves living in environments where people don't talk to them. Also, people tend not to interact with them socially in other ways as well. As a result, nonvocal children, who are often nonambulatory and unable to manipulate objects, have little opportunity to gain experience through interaction with others, seriously jeopardizing their development. It is impossible to exaggerate the significance of communication.

Communication Boards

Some type of sign language is one alternative for communication for the nonvocal; another alternative, and an even more basic one, is communication boards. Research is proving that even for students who are capable of speaking, it is the concept of what communication is that is lacking. Beginning with something as simple as a teacher-made communication board will often convey this concept.

(Discussion of the article "Communication Boards for Cerebral-Palsied Children" which appeared in the *Journal of Speech and Hearing Disorders*, Vol. XXXVIII, No. 1 (February, 1973), pages 73-88.

Actual examples of these communication boards shown)

Electronic and Mechanical Aids

Another alternative, along the same line as communication boards but much more sophisticated, is electronic and/or mechanical communication aids.

(Discussion of the paper *Electronic and Mechanical Communication Aids* prepared by the Texas State Learning Resource Center, July 1977.

Demonstration of the *Bliss Symbol Scanner* from Prentke Romich Company.

Discussion of *Typewriting for Blind Students* from the American Printing House for the Blind.)

Symbolic Language

Another alternative is symbolic language. In the discussion on electronic and mechanical communication aids, we spoke briefly about Bliss Symbols. In that paper "Electronic and Mechanical Communication Aids" there is a brief explanation of the origin and rationale for these symbols. It is difficult to completely separate symbolic language from electronic devices because they are often used together.

A symbolic language is not something that is easily or readily devised by a teacher. It also takes some adjustment by the persons in the environment of the student using the symbolic language. It is usually chosen as a communication alternative for a student who is nonvocal when there is a need for a means of communication which would be functional immediately. Also, symbols increase the generalizability of the child's limited symbol set and allow him or her to say more things with the few symbols s/he might acquire as compared to pictures. Each symbol system has its own advantages and disadvantages.

Before presenting an actual symbolic language, the author would like to make a comment concerning parent and family reaction to such things as signing, communication boards, and symbolic languages. When parents are first presented with any of these approaches to communication for their child, they will often experience a feeling of hopelessness. They might feel that this is the "best" communication that can ever be expected of their child and they don't like its differentness. It draws attention to their child. For some children these alternative approaches to communication may be the ultimate of their communication abilities. If so, isn't it better than a life of never being able to express their needs and wants? But parents also need help in understanding that the alternative communication approach that is being used with their child is a means of initiating the language process. Every attempt should be made to progress to more "normal" means of communication if this is in the child's abilities. There is no way of knowing this until the communication process is begun.

Non-Slip is a non-speech language initiation program developed by Joseph Carrier and Timothy Peak. It is commercially produced by H & H Enterprises, Inc., of Lawrence, Kansas. It teaches the student some of the basic tactics for learning communication behavior. It is a compensatory symbol system that may serve as an antecedent for subsequent language acquisition functions.

(View *Non-Slip* overview film.

Demonstration of the material *Non-Slip*, component parts, and use)

Specific Initial Language Materials

The last alternative will be three examples of specific materials directed toward developing initial expressive language. These materials deal primarily with developing oral language.

1. The first material is the Teaching Research Initial Expressive Language Program. This material was developed to provide an oral expressive language program for handicapped children of any chronological age who range in language ability from being nonverbal to being able to speak phrases of less than five words. The terminal objective of the program is to teach the child to speak

in phrases of five or more words. It is designed to be used by parents, teachers, volunteers, and aides. No specific prerequisite skills are required to teach this program.

The language program contains a series of eight terminal language behaviors (or behavioral objectives) that each child will acquire as s/he moves through the program. These objectives, by phase, are:

Phase I: Establish and Maintain Eye Contact: Given the verbal cue "Look," the child will maintain eye contact with the trainer for five seconds.
Phase II: Motor Imitation: Presented with a visual motor model by the trainer, the child will respond by correctly imitating that model.
Phase III: Motor and Vocal Imitation: Presented with a visual motor and a verbal model by the trainer, the child will respond by correctly imitating that model.
Phase IV: Verbal Imitation of Consonants and Vowels: Presented with a visual and verbal model of each consonant and vowel sound, the child will emit a verbal imitation of the sound presented.
Phase V: Verbal Imitation of Consonant and Vowel Chains: Presented with a visual and verbal model of each sound chain, the child will emit a verbal imitation of the sound chain presented.
Phase VI: Verbal Imitation of Words: Presented with a visual and a verbal model of each word, the child will name the object or action presented.
Phase VII: Identification of Objects and Action Words: Presented with a visual model and a verbal cue, the child will name the object or action presented.
Phase VIII: Word Chaining through Imitation: Presented with a visual and a verbal model, the child will imitate word chains of two, three, four, and five words.

Each of the eight phases contains the following components which assist the teacher to successfully use the training program:

1. Terminal Objective: This is the behavioral objective which the child should achieve when training is completed for each phase.
2. Prerequisite Behaviors: Any behavior which the child must have before entering the phase.
3. Materials Required: A specification of any materials, such as picture cards, objects, etc., which the teacher must have to present that phase to a child.

4. Procedure:

   (a) Introduction: A statement which summarizes the procedures used to conduct a given phase of training.
   (b) Recording the Data: Specific instruction with regard to the recording of the data for each phase.
   (c) Cues: Those things that a teacher does or says to present a phase to a child.
   (d) Placement in Phase: Specific instructions concerning how to place the child within a given phase after the placement test has been given.
   (e) Progression through Steps: Specific instructions are given to the teacher as to how s/he is to move students either to the next steps if the child is progressing appropriately and to alternative treatments if the child is not responding correctly.
   (f) Alternative Treatment Approach: A suggested list of different strategies and techniques that can be used to elicit the desired response when the original cues are not successful.
   (g) Steps: The various smaller behaviors which are a breakdown of the terminal objective.
   (h) Transfer of Learning: A description of procedures that can be used by teachers and parents to generalize and maintain the new language behaviors learned by a child.
   (i) Consequating: Appropriate consequences should be delivered after each response or opportunity for response at each step of the program. Before using the program the trainer may wish to review the discussion on consequences in Section II of the Teacher's Manual.

2. The second material is the Edmark Reading Program, produced by Edmark Associates. It was specifically designed for nonreaders. Originally the program was developed on a population of institutionalized trainable retarded. It is a reading program, but where traditional reading programs depend on the learner having language to develop reading skills, the Edmark Reading Program uses reading to give the student language. This seems illogical, but in the case of low-language-skilled populations it has proved successful.

   The Edmark Reading Program teaches a 150-word vocabulary, comprehension, and use of these words. There are 227 separate lessons of four different kinds. The lesson sequence is given in the Student Record Book. There is no time limit for program completion as the lessons are individually paced. The program is one-to-one for about 50% of its lessons, and the students may work independently, in some cases, depending on the student, in about half of the lessons. The program is nonconsumable, except for the Student Record Book, which also contains the Teacher's Guide.

The author will not address assessment of speech and communication capabilities. This is an area that involves the input of numerous professional personnel. You most certainly have some criteria for this assessment presently. Also, a number of commercial communication aid materials have the assessment component built in.

The author will not address sign language, at least not sign language as normally used by the deaf--Amaslan or Siglish. This is not a viable communication alternative for many deaf-blind students. For the students who can use this approach, you need training from someone with great expertise. However, there are a number of commercial materials on the market that can make learning finger spelling easier and fun. One example is Keep Quiet, a sign language crossword cube game from Kopptronix Company in Stanhope, New Jersey.

Modified Signing

One last point in the area of sign language--sign language does not necessarily have to be the type used by the deaf. Often these signs are too small to be seen by the student with visual problems and they require motor coordination that a student with physical problems does not have. A modified sign language could be an alternative. These modifications can be developed by the people working with the student or there are some modified signing manuals on the commercial market. One example is the Manual Language Dictionary, Functional Vocabulary for the Retarded, Booklets I, II, and III and is available from Edmark Associates. The three dictionaries are comprised of basic signs and vocabulary chosen specifically for the retarded. American Sign Language is the reference used for many of the signs. Other signs have been modified to make them more easily understood and to provide for the ease of implementation by those individuals with motor or visual impairment. The three dictionaries consist of several word lists, ordered from very concrete to more abstract levels of discrimination. The words meet the criterion of being a functional vocabulary composed of those words necessary to communicate everyday needs--school setting and residential setting. It is assumed that the dictionaries can be used as a reference manual for a core vocabulary in program planning. For each word there is a very clear, concise description of how to form the sign as well as a simple visual depiction of the sign. One comment on uses of these dictionaries. Some teachers utilizing the dictionaries in school copy the description and picture of the word they are working on with a particular student. This is then shared with the parents and family in order to help the student use his or her new communication at school and home and also to involve the family in the student's learning process.

Student prerequisites are very minimal. A student must be able to point with some part of the body to indicate a multiple-choice response. A student must also be able to say back or sign back to let the teacher know that s/he has learned the correct response. The response need only be accurate enough to let the teacher understand that the student knows the answer. When using the Edmark Reading Program with total communication and sign language for the deaf, the verbal cue should be paired with the sign. The only other prerequisites would be that the student have enough vision to see the materials and that the student have enough receptive language to elicit the earlier two responses of pointing and saying back.

The program may be taught by an aide or volunteer and no special training is required. The teaching strategy for using the program is to concentrate on giving as little help as possible and letting the student perform independently. Cues should be added only as necessary.

The entire program and all its component parts are contained within a blue metal box. The four different kinds of lessons are:

Pre-Reading and Word Recognition
Direction Books
Storybook
Picture/Phrase Matching

3. The last material is the Fokes Sentence Builder, published by Teaching Resources. The Fokes Sentence Builder is a comprehensive language program that aids children in developing speech and comprehension. The program provides a systematic approach to sentence construction through the ordering of five grammatical categories: WHO and WHAT (subject and direct object), IS DOING (verb), WHICH (adjective), and WHERE (prepositional phrase). Each category is designated by a colored box containing pictures representative of items within the word class. Children learn the items represented in each box and arrange them in a specific order.

Children are able to "read" the sentence as well as see the order of the pictured items. The visual display of boxes and the auditory stimulus of the spoken sentences are mutually reinforcing. Signing may be used in place of the spoken words. In addition, the manipulative activity of arranging the boxes and selecting pictures to form sentences not only keep the child's attention and interest, but the child's role in learning is active rather than passive.

Not only can many different sentences be composed by any one child, but also the program can be adapted to children at different levels of proficiency. Both the length of the sentences and their complexity can be controlled by the number of categories used and the way in which they are combined to form sentences.

Nonvocal children have various difficulties managing the complex tasks involved in communication. I have covered five types of alternatives for these students:

Modified signing
Communication boards
Electronic and mechanical aids
Symbolic language
Specific initial language materials.

No nonvocal student should be left without assistance in developing some type of communication that will meet his or her needs. Communication systems are the basis for nearly all aspects of the educational process.

Two last professional resources that the author would like to share. One is a book entitled Non-Vocal Communication Techniques and Aids for the Severely Physically Handicapped, edited by Gregg C. Vanderheiden and Kate Grilley, and published by University Park Press. The second book deals with communication but also with all aspects of programming for the handicapped student and is entitled Instructional Programming for the Handicapped Student by Daniel R. Anderson, Gary D. Hodson, and Willard G. Jones. It is available from Charles C. Thomas, Publisher.

Perhaps the most profound statement the author can make today is that acquisition of communication skills may be the most important developmental aspect of a human being's life.

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Script

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ELECTRONIC AND MECHANICAL COMMUNICATION AIDS

The objective of this presentation is to give an overview of simple electronic and mechanical aids used to help the physically handicapped individual who is non-vocal to communicate. Aids described utilize some electronic or mechanical components to transfer motion to indicate directly to the message-receiver letters, words, pictures, etc., which the individual is trying to communicate. With these aids, the message-receiver, therefore, does not have to interpret the movement, but does have to decode, write down or remember the letters or characters and assemble the message being transmitted.

The individual using the aid to communicate can indicate the letters, pictures, etc. which make up the message, consequently, very little knowledge of the system is required on the part of the receiver of the message. For this reason, the handicapped individual can communicate with a large number of people when this type aid is used as compared to when a complex aid with unique symbols is used. Although the amount of interpretation by the message-receiver is greatly reduced when a handicapped individual uses an electronic or mechanical aid, the undivided attention of the message-receiver is required.

Communication is significant; it has been the cohesive force in human cultures. It is a vehicle for social interaction and is essential for personal development. There are examples of older, physically involved individuals who appear to have very restricted personality development; they are often unmotivated and seem content to remain dependent upon others. They appear physically capable of doing more than they demonstrate. Possibly these impressions are due to delayed personality development. One reason for the restricted development may be the lack of stimulation which comes from interaction of communication with those around them. It is believed that many of the communication problems of severely involved individuals stem from the lack of interaction with others in the environment. Non-vocal or non-verbal individuals often find themselves living in a vacuum-like environment because people do not talk with them.

Assessment of an individual who is non-vocal

In an overall, comprehensive assessment of a non-vocal individual major facets to be evaluated include the physical, educational, communication and language skills which are functional and to attempt to predict possible future potential.

In the assessment of physical skills one observes response mode, posture or seating, hearing proficiency, vision and vocal skills. The response mode, or modes, is important since much of the rest of the assessment will be influenced by it. Posture and proper seating should be observed carefully, since physical skills may be seriously hampered by poor seating and poor posture. Hearing and vision should be checked to ensure what input channels are functioning. Vocal skills should be evaluated and tracked in order to use all avenues possible in the communication intervention program.

Educational skills are assessed by attempting to answer such questions as: Are there basic readiness skills? What is the length of the attention span? What are current math and reading comprehension skills? What can I expect in the way of achievement in the content areas? How is he/she expressing himself now? How effective is the expression in obtaining appropriate or desired responses? How does she/he express himself at home, with his peers, and with others in the classroom?

Finally, under language skills the teacher will want to know what expressive and receptive skills are intact and what cognitive milestones have been achieved so far.

Communication devices

Three different techniques appear to be the most widely used in electronic and/or mechanical communication boards; they are (1) scanning, (2) encoding, and (3) direct selection.

(1) Scanning

The formal definition of Scanning which has been formulated by the Trace Research and Development Center for the Severely Communicatively Handicapped at The University of Wisconsin, Madison, is:

> Any technique (or aid) in which the selections are offered to the user by a person or display, and where the user selects the characters by responding to the person or display. Depending on the aid, the user may respond by simply signaling when he sees the correct choice presented, or by actively directing an indicator (e.g., light or arrow), toward the desired choice. (Vanderheiden, Harris-Vanderheiden, 1976)

An example of a simple mechanical scanning technique would be a communication board with a rotating arrow or moving light which moves on schedule by electrical relay down and across rows of pictures, words or letters one at a time. The individual watches for the correct response and stops the signal on the desired letter, word or picture which he wishes to communicate. The signal is activated by a switch which is specially fitted to take advantage of some movement over which the handicapped individual has good control. For a child who can spell, this technique could be further automated so that the selection of letters are printed on a typewriter or other device. If the individual is completely non-vocal, it would be highly desirable to have a communication aid which could be moved around with him and function as his "voice".

A significant thing to notice about the scanning technique is that it can be used with individuals who have only minimal muscle or body control. If the individual has a recognizable "yes", or an affirmative signal of any form, any of the nonmechanical techniques and aids can be used, no matter how severe the handicap. If the individual has a reliable and recognizable signal, it can be tapped, with a special switch and used to control a mechanical or electronic type of scanning aid. Gross motor movement to a muscle twitch can be used as a control signal. The process is slow since time is spent presenting many unwanted choices prior to the presentation of the correct choice.

(2) Encoding

The formal definition for "encoding" which has been formulated by the Trace Center is:

> Any technique or aid in which the desired choice is indicated by a pattern or code of input signals or where the pattern or code must be memorized or referred to on a chart. When an aid is used, any number of switches may be used (e.g., one, two, seven, etc.). The code may involve activating the switch(es), sequentially or simultaneously. (Vanderneiden, Harris-Vanderheiden, 1976)

One simple, non-mechanical, encoding technique is the arrangement of letters of the alphabet in a matrix of 2 horizontal rows of 13 each. The individual can indicate which letter is desired, for example: the "L", by pointing to the number 3 and then pointing to the number 2 to show that he wanted a letter in the third row, second letter across. An example of when the encoding technique can best be utilized is with a learner who can only control his eyes. With this technique, the learner indicates which picture, word or letter is wanted on a vocabulary chart by using an eye gaze to indicate the number(s) which are printed next to that picture, word or letter.

This technique can be automated. An example of an automated system to be used with an individual who has spinal cord injury but who has fairly good control of upper neck muscles is to monitor the muscles so that by simply tensing them Morse Code or some other code can be used as the signal. This code can be decoded by an electronic aid and displayed so that the message-receiver can see the letter or word indicated. These techniques can be fully automated so that the letters print out directly onto a typewriter or other display area.

The encoding technique is generally faster if the individual has some form of quick motion, or if the individual is able to point directly to a moderate number (eight or so) of different squares or switches. For the individual who can operate only a few switches and whose movements are slow and erratic, as may be found in some severely athetoid or spastic cerebral palsied children. the encoding approach may be very slow, even slower than scanning. The specific abilities of the learner must be taken into account before a comparison of the approaches can be made.

Two other aspects should be noted about techniques that use the encoding approach. First, this approach often requires more responses and therefore more work for the learner. This may be good or bad, depending upon how quickly the individual tires and the limits of his physical abilities. Secondly, the encoding technique is more abstract than the scanning approach, where the choices are more directly presented to the learner, and for those with cognitive handicaps or very young children this may present a problem. However, people who have implemented various encoding techniques have found that children pick them up faster than was originally anticipated.

(3) Direct Selection

The direct selection technique, which is the most straightforward and common of the three, has been formally defined by the Trace Center as follows:

> Any technique (or aid) in which the desired choice is directly indicated by the user. In direct selection aids there is a key or sensor for each possible choice or vocabulary element. (Vanderheiden, Harris-Vanderheiden, 1976)

The simplest example of direct selection is direct gesture, where an individual simply looks at the door when he wants to go out, points to the bathroom when he wants to go to the toilet, points to a glass for a drink, etc. Another very familiar example of the direct selection approach is the letterboard or communication board. The individual indicates directly with his hand or headstick the letters, words or pictures which he wants to use to make up his message.

Any kind of keyboard, including those that are expanded, guarded, or otherwise modified would be examples of direct selection aids. Direct selection techniques can, of course, be used in portable, printing communication aids as well.

(4) Combination Techniques

Many times specific approaches such as scanning, encoding or direct selection will not meet the need of a particular individual. In those cases, a combination of the characteristics or advantages of two of the approaches may be necessary. For example, scanning and encoding techniques could be combined to form a scan/encode system. This system could provide a very simple one-switch control for a severely physically involved individual, but because it uses the encoding technique, would allow for quick access to a fairly large vocabulary.

Which Technique to Use?

It should be apparent that there are a number of different techniques, each with its own advantages and disadvantages. There are no simple guidelines which can be generated to help in the selection of a particular approach for a particular person. It may be best to start with the direct selection approach if the individual has those abilities since it seems to hold the greatest potential, speed and simplicity. And, if the person is able to develop enough skill to use a typewriter, this may be the most inexpensive and most direct means to express oneself. Even for those who will not learn to spell, the straightforwardness of the direct selection approach may be very important in helping the learner to communicate earlier.

A large percentage of severely handicapped individuals, however, will not be able to use any of the direct selection approaches, particularly not in the beginning. For these individuals it is important to provide them with an appropriate communication system even if work on developing pointing skills is under way. Some communication system should be set up immediately so that the learner has a viable means of interaction while work proceeds on the development of additional skills.

IMPLICATIONS AND ADVANTAGES OF THE VARIOUS LEVELS OF IMPLEMENTATION

In the Appendix to this script is a matrix pertaining to the three communication device approaches discussed previously. The chart correlates these approaches with the levels of implementation. An interpretation of the levels of implementation might lead one to believe that the further down the chart one moves the more functional ability for the user. It is true that the further down the chart the learner moves the less work that needs to be done by the message-receiver. It is not necessarily true that the portable independent aids are the best aids for everyone. There are constraints which cause one aid to be much more applicable to an individual than another. For instance, most of the independent portable aids cannot be used with pictures or other symbols outside of the letters of the alphabet.

For this reason these aids cannot be applied with those who are still on a picture level, those who cannot read, or those who will be communicating in only one or two symbol utterances. For these individuals and for others just starting out, the fundamental and simple aids are much more powerful since they can be used with letters, pictures, words, or other symbols. For those at a developmental level, or for those who may not be able to read or spell, simpler aids are more appropriate.

Another variable is that a handicapped individual may not be able to acquire the communication aid which is most appropriate due to financial restrictions. Aids in the fundamental category generally run between $5 and $50 when made by the teacher, therapist or parent, or from $10 to $150, if bought commercially. Simple electronic and mechanical aids generally cost from $50 to $100 up to about $1,000. Fully independent aids, with print-out capability or portable usually cost from $1,000 to $7,000 depending upon how many accessories are needed. Part of the high cost at the present time is due to the large amount of demonstration and information dissemination that must be done in connection with selling the aids. As these aids become more widely known and used, these introductory costs will decrease along with production costs. If this is true, there will be a decrease in the cost of aids. When one compares the cost of these communication aids to either (1) the cost of providing the non-vocal child with a dedicated second person to interpret his messages and allow him to do independent work, or (2) the cost of hospital school settings where many of these children now receive educational training, the aids seem to be not only necessary but cost-effective.

Page 29 of Texas Education Agency, *Bulletin 711, Administrative Guide and Handbook for Special Education,* Revised (1973) makes reference to "Electronic Communication Services." This section states: "Electronic communication services are available to any child who is eligible for homebound instruction and needs the services for five months or more of the school year." Contact with the Texas Education Agency indicates that this partial reimbursement applies to school/home telephone services only and would not apply to financial assistance with electronic communication aids.

INPUT INTERFACES

One major concern in the selection of any electronic or mechanical communication aid is the aspect of how the child, or handicapped individual will interface with the aid. In the appendix attached to the script are examples of ten major types of switches that can be used to activate electronic communication aids. Most of these switches can be fitted to most scanning and encoding types of aids. Most of the categories are, of necessity, very general to allow many variations and styles. For example, the shielded button used in one aid may have little resemblance to the shielded button used in another, and even less resemblance to the conceptual sketch given here. Yet they all work in the same manner and require the same sort of action by the user. The examples of the various switches are given here to reemphasize the importance of assessing and knowing the needs of the individual non-vocal child, and matching the communication aid to the specific need.

BLISS SYMBOLS

Many electronic communication aids utilize the Bliss Symbols as a communication modality. Blissymbolics, also called Semantography, is a symbol system developed by Mr. Charles Bliss as a bridge between meaning and traditional writing. Mr. Bliss has attempted to create an easily learned international modern language for communication. Bliss Symbols were developed to find a communication vehicle for non-vocal, non-reading children.

The Bliss Symbol system is composed of about 100 basic elements. This array of elements is combined or manipulated to form symbols. Bliss began with numerals and mathematical symbols which are international and added symbols he devised. The symbols are based upon meaning and, consequently, symbols which deal with a similar topic will have common components. An abbreviated explanation of the Bliss Symbols is located in the Appendix.

One of the principle advantages of the Bliss Symbols is that they appear to be learned easily. Another advantage of the symbols is that they seem to be more generalizable. This is important when there are only a few symbols that have been learned and there is a need to generalize in order to communicate. The symbols contribute to the child's total development: social, emotional, and self-concept. The attitude of other people, on the whole, seems to become positive.

Some disadvantages of the Bliss Symbol System relate to their not being used widely. This causes a problem in providing adequate models for the learner. The symbols are not used for everyday communication so it is difficult to find the quickest and easiest way to express oneself. This same problem is faced by those using other types of communication boards or electronic communication aids. Another problem is the limited vocabulary presented on the board.

Some people feel threatened by the symbol system. For some parents the introduction of symbols, or for communication boards of all types and any alternative communication system, is seen as a confirmation that the child will never develop speech.

Another disadvantage to the Bliss Symbols is that there is presently no way to provide the user with a print-out. Unlike aids which use standard words and can use standard printers, aids which use Bliss Symbols do not have any print-out component. With a print-out component the individual could prepare an answer while other learners were giving their answers. Another disadvantage of the Bliss Symbols, that is also common to communication boards, is that there is not as much eye contact as would be preferred. The communication board is in front of the child, and he must therefore look down at it rather than at the individual to whom he is responding.

Symbols do not provide a perfect substitute for speech, but they do provide one means of communication for those who are severely involved.

SUMMARY

This presentation has covered the three basic approaches used in electronic and mechanical communication aids: scanning, encoding, and direct selection. Also covered was a brief overview of Bliss Symbols; these symbols often being used with electronic communication aids for the severely physically handicapped. In the Appendix is a bibliography which is topical in format. Also attached is a list of producers and distributors of electronic and mechanical communication aids which are available commercially.

APPENDIX

1. Matrix: Communication Devices according to Classification Type and Level of Implementation
2. Switches for Use on Communication Devices
3. Bliss Symbols, A Brief Explanation
4. Bibliography
5. Communication Aid Reference List

Pages 196-201 taken from Non-Vocal Communication Techniques and Aids for the Severely Physically Handicapped edited by Gregg C. Vanderheiden and Kate Grilley. Baltimore, Maryland: University Park Press, 1976. $ 12.50.

GLOSSARY OF INPUT INTERFACES

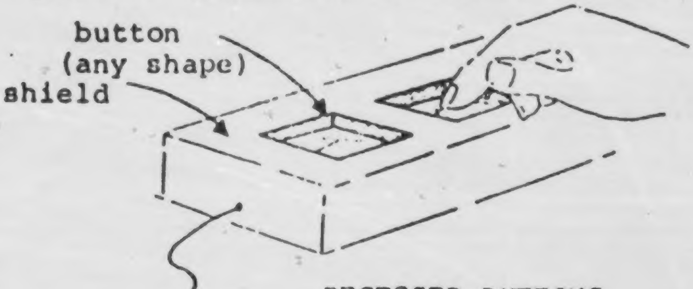
MECHANICAL SWITCHES FOR THE EXTREMITIES - fingers, hands, elbows, feet (Many can also be used with a headstick

Sub-types:
- h - intended for fingers or hands
- f - intended for feet
- t - intended for tongue

A. PUSH BUTTONS There is a very wide variety of shapes and sizes. Two special types are noted:

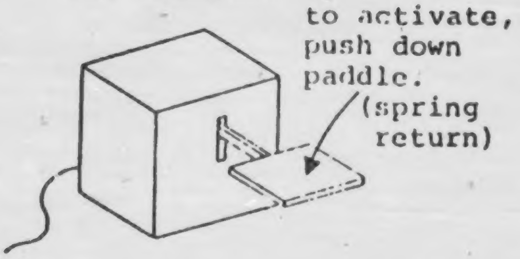
Ak - Keyboard-style buttons, similar to those found on an ordinary electric typewriter.

Ar - Recessed (shielded, guarde) buttons. The "shield" helps prevent accidental activation of buttons.

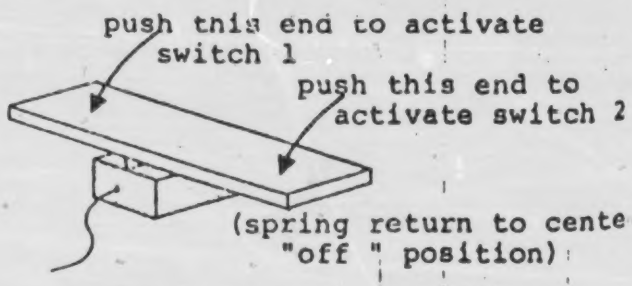

button
(any shape)
shield

RECESSED BUTTONS

B. PADDLES AND LEVERS - There are many shapes and sizes. For example:


to activate,
push down
paddle.
(spring
return)

PADDLE SWITCH

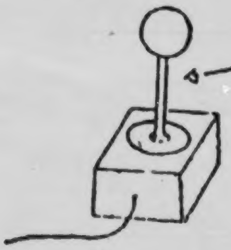

push this end to activate
switch 1
push this end to
activate switch 2
(spring return to cente
"off " position)

SEE-SAW ROCKING LEVER
(2 switches)

C. PILLOW SWITCH - Punch a "pillow" or pad to activate the switch.

MECHANICAL SWITCHES FOR THE EXTREMITIES (cont.)

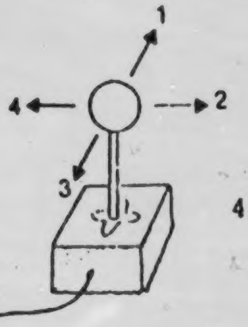
D. WOBBLESTICK - (Possum Controls Ltd.)



push the stick off-center in any direction to activate switch.

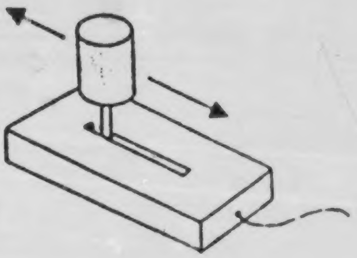
WOBBLESTICK

E. JOYSTICK - Multiple switches are operated by one control stick. In general, 2 to 8 switches are incorporated.

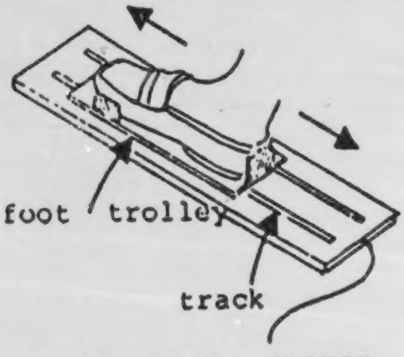


4-SWITCH JOYSTICK

F. SLIDING OR TROLLEY SWITCHES - Switching is accomplished by motion along a slide, groove, or track, These switches usually have 2 positions ("on" at one end, "off" at the other) or three positions (one switch at each end, "off" in the middle).



SLIDE SWITCH

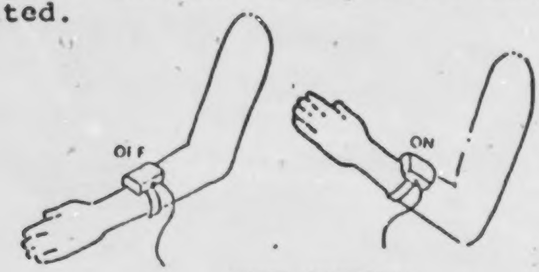


FOOT-TROLLEY SWITCH

G. POKE SWITCHES - Activate by poking a pointer in a hole or indentation (PMV "Minimum").

MECHANICAL SWITCHES FOR THE EXTREMITIES (cont.)

H. TIP OR TILT SWITCHES - Tilted one way the switch is "off", tilted the other way it is "on." The switch would be strapped to the arm or any other body part which can be tilted.

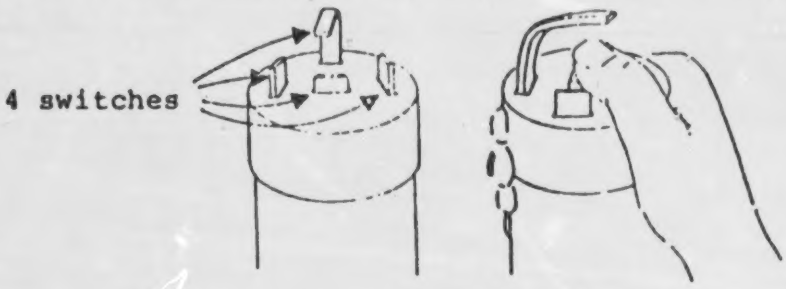


TIP SWITCH

MECHANICAL SWITCHES FOR A SPECIFIC BODY PART

K. These switches are fitted to a specific body part and are activated by a particular motion.

- Ka - Head switch. Activate by lateral (side to side) head motion. ("Tic"- Tuft's Interactive Communicator)
- Kc - Chin switch. Squeeze switch between chin and chest.
- Ke - Eyebrow switch. Raise eyebrows. (Veteran's Administration, "speakeasy")
- Kn - Knee switch.
- Kp - Palate switch. Press toungue up against switch molded to fit in the palate.
- Ks - Splint switches. Amolded hand splint with miniature paddle switches mounted above or below the fingers. (Possum Controls Ltd.)
- Kt - Tongue switch-lever operated by the tongue.
- Kv - Thumb switch. (Fairchild-Hiller, "Viewcom")



THUMB SWITCH

- Kw - Wrist switch, Rotate wrist. ("Tic": Tuft's Interactive Communicator)

CLASSIFICATION TYPE

LEVEL OF IMPLEMENTATION

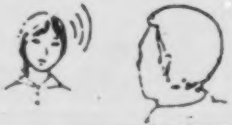
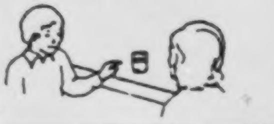
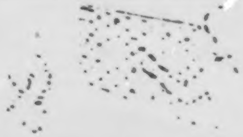
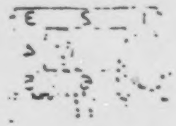
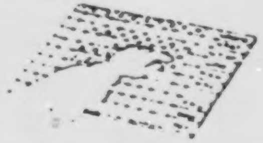
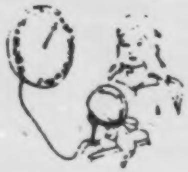
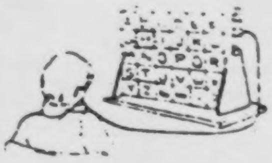
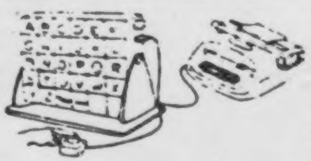
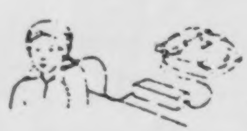
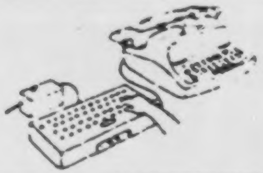
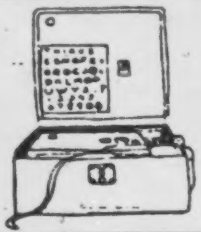
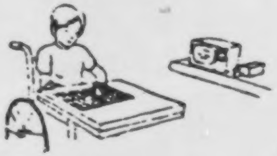
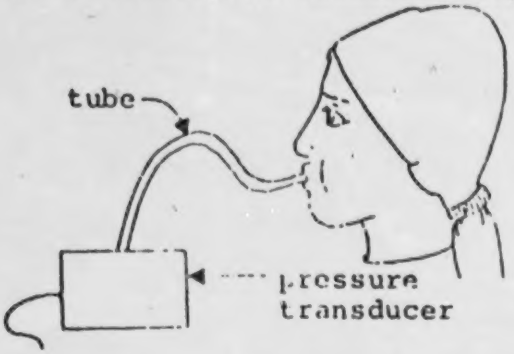
	Scanning	Encoding	Direct Selection
Unaided			
Fundamental			
Simple Electronic			
Fully Independent (Printed Output)			
Fully Independent and Portable			

Figure 10.

Example taken from Non-Vocal Communication Techniques and Aids for the Severely Physically Handicapped: Based upon Transcripts of the 1975 Trace Center National Workshop Series on Non-Vocal Communication Techniques and Aids edited by Gregg C. Vanderheiden and Kate Grilley. Baltimore, Maryland: University Park Press, 1976. $ 12.50.

PNEUMATIC SWITCHES

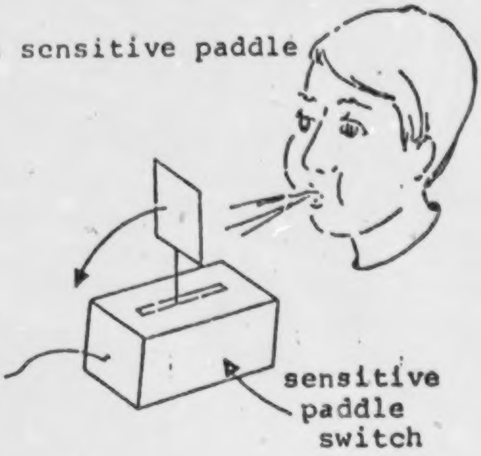
L. **SUCK AND PUFF** - The switch is operated by very small pressure changes in the tube. Mouth control rather than respiratory control, is usually sufficient to operate this switch.



SUCK AND PUFF SWITCH

M. **AIR PADDLES** - Activated by blowing at a sensitive paddle switch.

AIR PADDLE



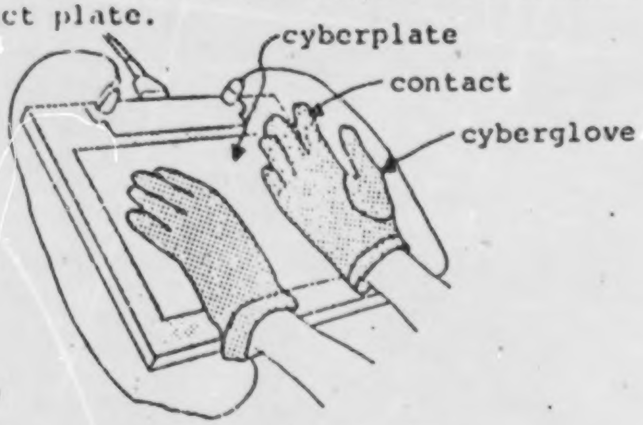
TOUCH SWITCHES - These require contact, but no physical pressure.

N. **TOUCH-PLATE** - Activated by touching a prescribed sensor area with any skin surface.

Nt - Designed for use with the tongue.

TOUCH SWITCHES (cont.)

P. CYBERGLOVE AND CYBERPLATE - (Cybernetics Research Institute) Gloves with contacts on the fingers are touched to a metal contact plate.



CYBERGLOVE AND CYBERPLATE

MOISTURE SENSITIVE SWITCHES

Q. MOISTURE SWITCH - Activated by contact with the tongue. A moisture sensitive switch will not be activated by contact with dry skin.

PROXIMITY SWITCHES

R. PROXIMITY SWITCH SENSITIVE TO BODY - Activated when a body part is brought within a certain range of the switch.

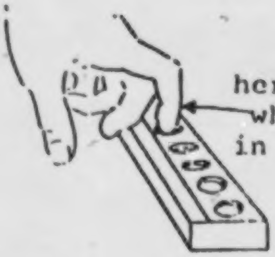
S. PROXIMITY SWITCH SENSITIVE TO A SPECIAL TRIGGER ELEMENT - Activated when a special object (metal, magnet, circuit, etc.) is brought within a certain range of the switch.

OPTICAL SWITCHES

T. LIGHTSPOT - The beam from a light source (attached to the head or some other body part) is used to operate photosensitive switches on a panel in front of the user. The user can see the lightspot on the panel and maneuver it to the desired photosensor.

OPTICAL SWITCHES (cont.)

U. INTERRUPTED-BEAM SWITCH - Activated whenever a beam of light is interrupted (by a finger or some other body part).



here a beam is broken when a finger is placed in the hole.

INTERRUPTED-BEAM SWITCH

SONIC SWITCHES - Activated by sound

X. WHISTLE SWITCH - The switch is activated by the sound of an ultrasonic dog whistle. The whistle can be blown by punching a rubber bulb connected to its mouthpiece. With this type of switch, no physical connection is needed between the user and the communication aid. ("Tic": Tufts Interactive Communicator)

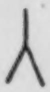
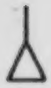
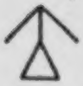
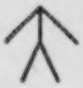
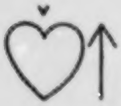
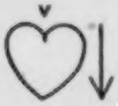
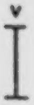
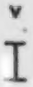
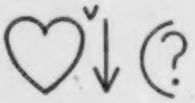
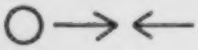
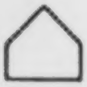
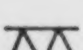
BIOELECTRIC SWITCHES - Activated by the electrical impulses generated in nerves and muscles of the body.

Y. MYOELECTRIC SWITCH - Electrodes are applied to the skin near a controllable muscle group. Contraction of the produces electrical signals whech are detected by the electrodes and used to activate the switch.

Bliss Symbols,

A Brief Explanation

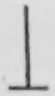
To the left side of this sheet are twelve Bliss Symbols and their translation into English. These are representative words found in the vocabularies of most individuals.

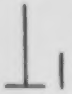
	man
	lady
	mother
	father
	happy
	sad
	big
	little
	afraid
	hello
	home
	animal

BLISS SYMBOLS

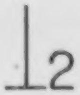
The attached script shows twelve words often needed in communication by children and the corresponding Bliss Symbols. It will be necessary for you to follow along in the script at this time since it is easier to explain the structure of the symbols when the symbols are available to look at.

The symbols which represent people are shown below; the number 1 person is the child: I, me, or mine. Since symbols in Bliss Symbols stand for concepts, and not specific words, the young child can use the symbol for "I" to mean "mine", the possessive form, or to mean "me", the objective form. "You" is the second person, number 2. That person who cannot be seen directly is number 3.

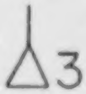

person



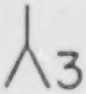
I, me, (my)



you, (your)

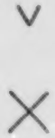


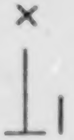
she, her



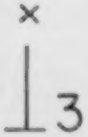
he, him, (his)

The multiplication mark is used over any symbol to convert it to the plural. The children learn that symbol as "much," or "many."


much, many

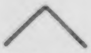


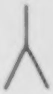
we

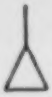


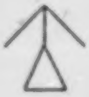
they

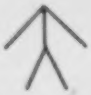
The symbols for man and woman are very simple. The roof symbol denotes protection. So the woman who protects, or the woman who lives in your house, is your mother. The man who protects is your father.


roof

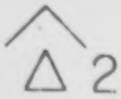

man


woman

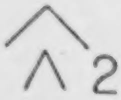

mother


father

The brother is that male person in your house who is number 2, (never number 1!) and the sister in your house is the female number 2, (never number 1!). Some of the symbols are more pictorial while others are more arbitrary. The pictorial ones are usually introduced to the children first. After they get the idea of symbols representing meaning, more abstract symbols can be introduced.

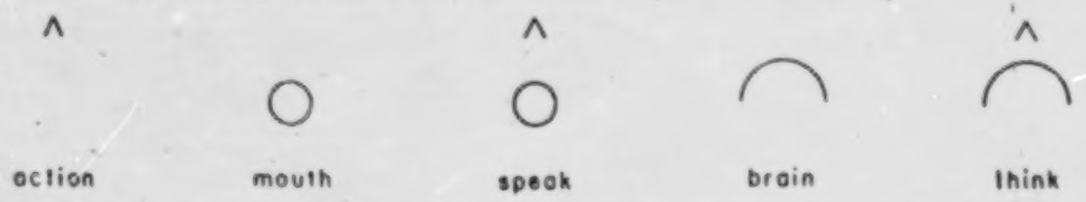


sister

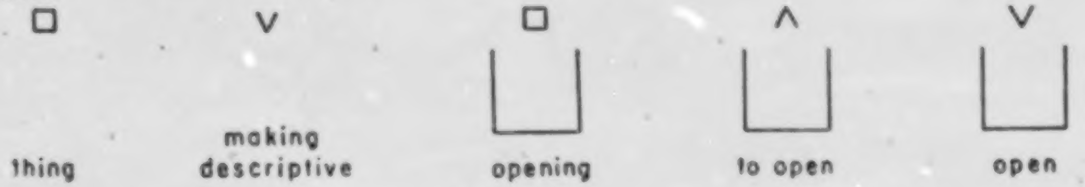


brother

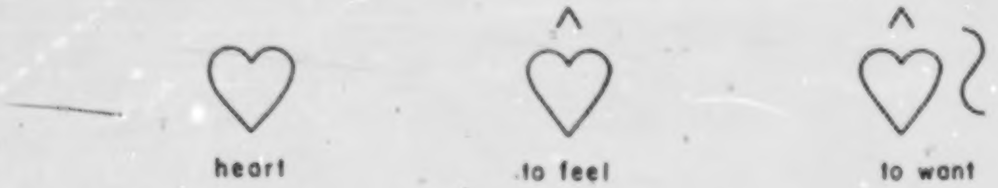
The inverted V represents the "action" symbol. It is used over another symbol to denote action associated with that symbol and to change it into its verb form. For example, when used over a part of the body such as the mouth, it changes the meaning from "mouth" to "speak." The one children like best is when you "make action with your brain," and then you "think."



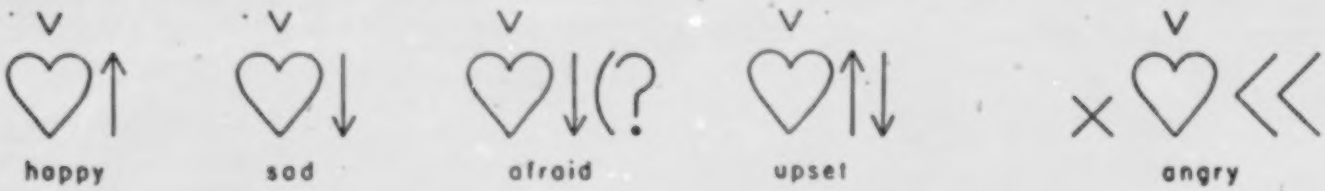
The "thing" symbol (a little square over the symbol) converts a symbol to a noun. The evaluation symbol (an upright V over the symbol) is used for adjectives and adverbs.



All emotions are based upon the heart. When you make action with the heart you feel something. To want something involves the heart and action symbol plus the action for flame or heat (to burn with desire).

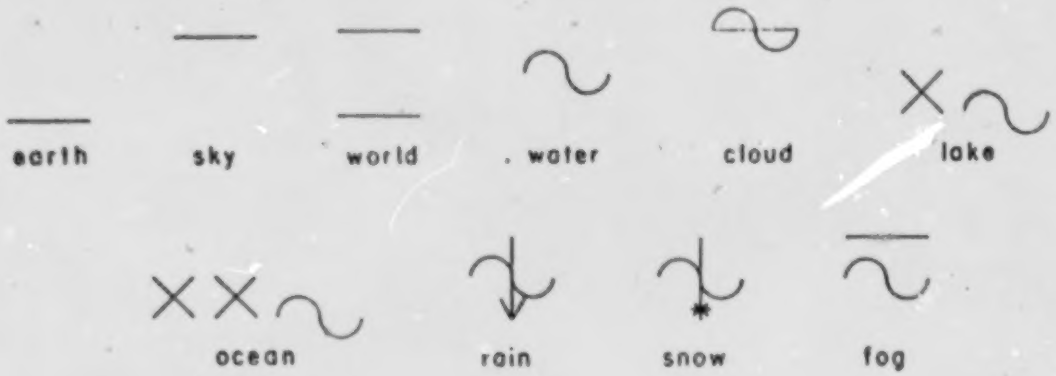


The heart is used in a lot of adjectives as well. When you are "feeling up," you are "happy;" "feeling down," you are "sad." If you are "feeling afraid" (sad about the future which is unknown), you add the symbol future and a question mark to the symbol for "sad." If you do not know if you are "feeling up or down," you are "upset." Anger is represented by thrusts directed toward the heart. The multiplication sign indicates much anger.



This is just a brief overview of some of the over 100 basic elements of the Bliss Symbols. The accuracy in writing symbols is very important. Symbols can take on a new meaning if they are placed in a different position. The same line placed at the bottom of the space becomes the earth symbol. If it is at the top it is the sky.

If there are both lines, the symbol is the world, which is the space between the earth and the sky. Water in the center position is water in general. At the skyline, it is clouds; at the baseline and there is much of it, it is a lake. If there are two multiplication marks in front of it, it is the ocean. Many different meanings are derived by combining other symbols with the symbol for water. Water coming down in the direction of the arrow is rain. If it is in the shape of a star it is snow. Water under the sky is fog.



One thing that symbols cannot do easily for the children's usage is to discriminate between a cow, horse, pig, goat or sheep. Bliss provides for this distinction by adding numbers and distinguishing body parts, but using these add greatly to the number of symbols on a display. The general symbol for animal is more functional and versatile for the children.

It is important to note that on every display a child uses, whether electronic or not, a word always appears under the symbol. This makes it easy for people who do not know the system to be able to communicate with the child. The role of the teacher in symbol use is of major importance. In this instance, even more so than in others, the instructor must set a model for the children. One responsibility is, therefore, to know the system and know its potential.

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Germantown, Maryland 29767

VISTA (VISUAL INSTANT SCANNING
TYPEWRITER ADAPTOR)
Bush Electronics Co.
1245 Folsam Street
San Francisco, California 94103

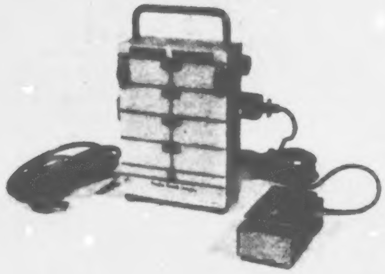
VOTECS (VOICE OPERATED TYPE-
WRITER AND ENVIRONMENTAL
CONTROL SYSTEM
VDETS (VOICE DATA ENTRY
TERMINAL SYSTEM)
SCOPE Electronics Inc.
1860 Michael Faraday Drive
Reston, Virginia 22090
703/471-5600

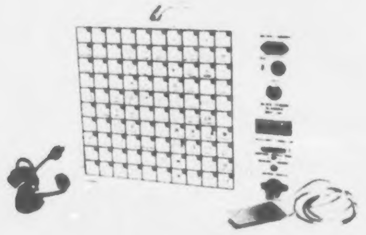
VOTRAX
Federal Screw Works
Vocal Interface Division
500 Stephenson Highway
Troy, Michigan 48084

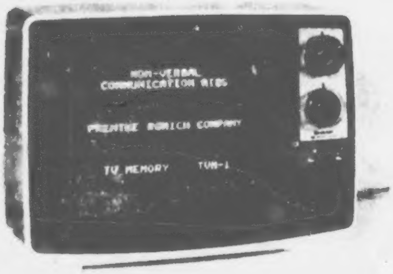
ZYGO COMMUNICATOR
ZYGO Industries, Inc.
Box 1008
Portland, Oregon 97207
503/292-4695

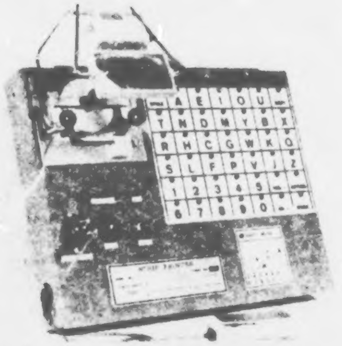
Non-Verbal Communication

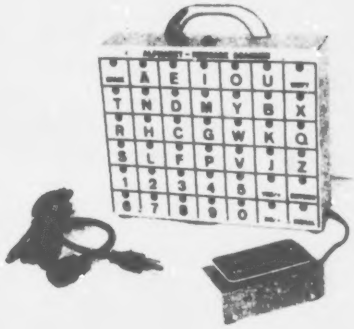
Alternatives for the Handicapped











The three basic approaches to non-verbal communication aids are:

SCANNING Scanning generally refers to a technique in which the apporpriate units of communication are configured in a line or matrix. The user then controls a system which steps through the units until the desired unit is reached.

ENCODING Encoding generally refers to a technique in which each unit of communication is defined by a particular pattern of inputs: either time sequence or combination.

DIRECT SELECTION Direct Selection generally refers to a technique in which each unit of communication is defined by a particular input.

The appropriate technique for a particular user is primarily a function of his capabilities. This chart may be helpful in selecting an aid.

TECHNIQUE	ADVANTAGES	DISADVANTAGES	EXAMPLES
Scanning	Can be operated with 1, 2 or 4 control switches.	Relatively slow. User must see display.	Message Selector Alphabet-Message Scanner Scanning Strip Printer Bliss Symbol Scanner
Encoding	Faster than scanning. No display necessary.	Complex control requires more effort.	Encoding Strip Printer
Direct Selection	Relatively fast.	Requires good motor skills.	ELKOMI 2

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Prentke Romich Company R.D. 2, BOX 191 - SHREVE, OHIO 44676 - (216) 567-2906

CONTROL SWITCHES

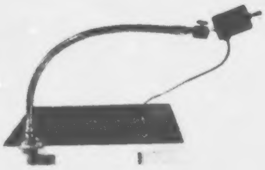
The effectiveness of a communication aid is a function of the match between control switch and user. Prentke Romich Company offers a number of standard control switches and can offer ideas and technical assistance if specials are required. RL provided.

Rocking Lever Switches RL-1 and RL-2

The Rocking Lever switches are generally activated with gross hand or arm movements or with a mouthstick. They require about 30 grams (1 oz.) of force. The dimensions are 2"Wx4"Lx1½"H.

Tongue Switch TS-2

The Tongue Switch is mounted on a 19" flexible gooseneck, clamp bracket and ball and socket swivel for easy positioning. The switch is inside a 1"x2"x3" plastic box and is generally operated using tongue or lips, requiring about 15 grams (½ oz.) of force.

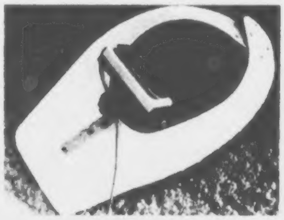


Pneumatic Switch PS-2

The Pneumatic Switch consists of a clamp bracket, 19" flexible gooseneck and replaceable mouthpiece. The mechanism is housed in a 2"x3"x4" box. Blowing activates one switch and sucking activates the other. Pressure or vacuum corresponding to about 4 cm. (1½") of water is required. Pushbuttons permit manual operation.

Chin Switches CS-1 and CS-2

Both the single and dual rocking lever switches are available mounted on a collar that can be worn. The switch can then be operated using the chin. The switch position is adjustable to accomodate users of various sizes.

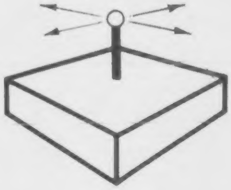


Arm Slot Control ASC-4

The Arm Slot Control was developed at the Children's Hospital at Stanford. It has four paddles arranged in an arc. When the user places his arm on a paddle, a switch is activated. Barriers between paddles prevent the arm from sliding off the paddle.

Joystick

The joystick is a convenient implementation of four switches. When used with a row-column scanner, the lights will scan in the direction the joystick has been pushed.



CALL SIGNAL

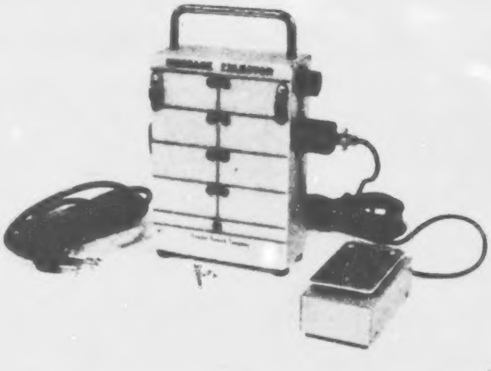
The Call Signal CS-1 can be activated using any of the single or dual control switches. It is a battery powered device that can also be used for training and evaluation of the control switches. Two lamps indicate which side of a dual control switch has been activated. The box measures 3"x4"x1½".

SCANNING AIDS

LINEAR SCANNING	In linear scanning, the display must step through all intermediate units of communication to reach the desired unit.

MESSAGE SELECTOR

The Message Selector is a simple linear scanning device. The white plastic panel contains eight spaces suitable for printing words or messages or drawing or attaching Bliss symbols or pictures. A small lamp corresponds to each space. Every time the user activates the control switch the light will step to the next location. If the switch is maintained, the light will continue to step at an adjustable rate until the switch is released. A ninth lamp indicates an audible signal location to permit the user to call for attention. The small size and light weight make the device easily portable. The unit measures 5"Wx7"Hx2¼"D and weighs 2 lb.



Control Switches Separately

Rocking Lever Switch RL-1	$31.00
Rocking Lever Switch RL-2	$35.00
Tongue Switch TS-2	$50.00
Pneumatic Switch PS-2	$75.00
Chin Switch with Collar CS-1	$70.00
Chin Switch with Collar CS-2	$75.00
Arm Slot Control ASC-4	$65.00
Arm Slot Control ASC-5	$75.00
Joystick Control	$75.00

Adapter Cables

Automatic Dialing Telephone Adapter Cable AC-ADT	$20.00
Single Adapter Cable AC-1	$16.00
Dual Adapter Cable AC-2	$20.00
To subsitute any adapter cable for a Rocking Lever Switch, deduct	$15.00

Substitution of Control Switches

TO ORDER A DEVICE WITH	INSTEAD OF (NORMALLY PROVIDED)	ADD
TS-2	RL-1	$19.00
TS-2	RL-2	$15.00
PS-2	RL-1	$44.00
PS-2	RL-2	$40.00
Chin Switch	RL-1	$44.00
Chin Switch	RL-2	$40.00
Arm Slot ASC-4	RL-2	$40.00
Joystick	RL-2	$40.00

Most shipments are by U.P.S. Foreign Shipments are freight collect, via air; or parcel post for small packages. Prices are in U.S. Dollars, F.O.B. factory, and are subject to change without notice.

1977 PRICE LIST

Environmental Controls and Accessories

Environmental control Unit ECU-1, Input Display, RL-2	$600.00
Environmental control Unit ECU-2, RL-2	$375.00
Automatic Dialing Telephone ADT-5A, Handset, gooseneck	$450.00
Automatic Dialing Telephone ADT-5A, Speakerphone Adapter, SA-1, RL-2	$615.00
Alternative Action Dialing Adapter DA-1	$ 35.00
Modular adapter MPA-1	$ 8.00
Speakerphone Adapter SA-1	$200.00
AM-FM Clock Radio AFR-1, RL-1	$275.00
Intercom, RL-2	$195.00
Intercom Latching Adapter	$ 40.00
Bed control (For most beds)	$110.00
Remote receptacle	$ 45.00
Television channel selector TCS-1, RL-1 (available 3rd quarter, 1977)	
Buzzer	$ 15.00
Call Signal CS-1	$ 35.00

Typical Combination Environmental Control Systems

Environmental control, RL-2, Automatic Dialing Telephone, Remote receptacle, Alarm buzzer	
With ECU-1 and Input display, order SYSTEM ECU-1A	$1090.00
With ECU-2 order SYSTEM ECU-2A	$ 865.00
Environmental control, RL-2, Automatic Dialing Telephone, AM-FM Clock radio, Remote receptacle, alarm buzzer	
With ECU-1 and Input display, order SYSTEM ECU-1B	$1355.00
With ECU-2, order SYSTEM ECU-2B	$1130.00
Environmental control, RL-2, Automatic Dialing Telephone, AM-FM Clock radio, Intercom, Remote receptacle, and buzzer.	
With ECU-1 and Input display, order SYSTEM ECU-1C	$1520.00
With ECU-2, order SYSTEM ECU-2C	$1295.00
To add Speakerphone Adapter to above systems, and delete the handset and gooseneck, add	$ 165.00

Communicaton and Educational Needs

Message Selector MS-1, RL- 1	$140.00
Alphabet-Message Scanner AMS-3, RL-1	$360.00
Package of ten blank display masks for AMS-3	$ 20.00
Bliss Symbol Scanner BSS-100	$480.00
Memory for BSS-100	$140.00
Package of ten blank display masks for BSS-100	$ 25.00
Bliss Symbol Scanner BSS-512	$890.00
Memory for BSS-512	$150.00
Package of ten blank display masks for BSS-512	$ 40.00
Votrax Input Scanner VIS-1	$960.00
Scanning Strip Printer SSP-2, RL-2, 3 paper cartridges	$990.00
Optional Data Transmission Interface DTI-1 for SSP-2	$100.00
Package of ten paper cartridges for SSP-2	$ 25.00
Television Memory TVM-1	$600.00
Vinyl-Covered Carrying case, fits BSS-100, BSS-512, SSP-2, and VIS-1	$ 39.00
Encoding Strip Printer ESP-1 with keyboard	$790.00
ELKOMI-2	$595.00
System 80 Interface S-80-I	$340.00
Training Aid TA-1	$125.00
Call signal CS-1	$ 35.00

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ROW-COLUMN SCANNING Row-column scanning is faster than linear scanning since rows and columns can be scanned independently. This method is appropriate for larger numbers of units of communication.

Prentke Romich Company has developed an assortment of functional modules that can be assembled to provide a variety of row-column scanning communication aids. Generally these aids consist of a matrix of lamps, each corresponding to a symbol, letter, function, etc. Only one lamp is on at a time and the system permits the user to move the lighted lamp around in the matrix. The rate at which the light scans is adjustable. Each aid provides for field selection of the following modes of operation in order to best utilize the capabilities of the user:

1, 2 or 4 Control Switches

1◺ In this mode, sequention activations of the single control switch will scan the display DOWN then RIGHT. The display will always start scanning in the upper left corner.

1□ In this mode, sequential activations of the single control switch will scan the display DOWN, RIGHT, UP, LEFT, DOWN, RIGHT, etc.

2 In this mode, one switch alternately scans the display UP and DOWN and the other switch scans it LEFT and RIGHT.

4 In this mode, one switch scans the display in each direction.

IMMEDIATE or DELAYED RESPONSE

IMMEDIATE The system responds to every switch activation.

DELAYED The system responds only after a switch has been maintained for a full scanning period. This mode is slower than the above, but permits effective control by spastic users.

DIRECT or LATCHING SCANNING

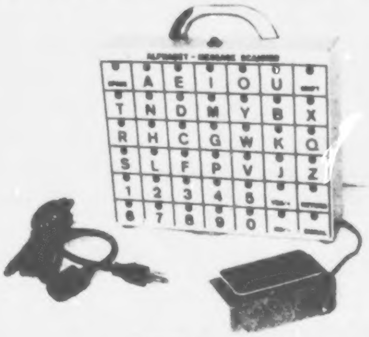
DIRECT The display will scan only while the control switch is activated.

LATCHING Activation of the control switch will start the display scanning. A second activation is required to stop it.

All the scanning aids are portable rechargeable battery operated devices. All incorporate a call signal that can be activated by the user. All can be operated by a variety of plug-in switches. The rocking lever switch is normally provided. A tone pulse accompanies each scanning step to provide audible feedback, and a switch permits turning off the tone.

ALPHABET-MESSAGE SCANNER

The Alphabet-Message Scanner has six rows and seven columns. The display locations include the alphabet and numerals. The characters are organized approximately such that those easiest to select are most frequently used in English literary text. A display mask is provided to cover the panel and permit the use of words, pictures, Bliss or other symbols. Additional masks can be ordered.

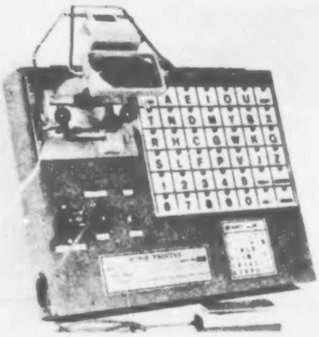


SCANNING STRIP PRINTER

The Scanning Strip Printer SSP-2 is a fully independent portable communication aid. When one of the 63 characters on the display is selected, that character is printed on a strip of heat sensitive paper (no ink or ribbon required). Operation is silent. The paper tape comes in a cassette and should be available locally.

An optional lighted magnifier enlarges the image of the printed characters, and requires 115 volt AC power for its lamp.

An optional Data Transmission Interface DTI-1 permits connection to a teletypewriter for printing on a standard letter size sheet, or on a paper roll.



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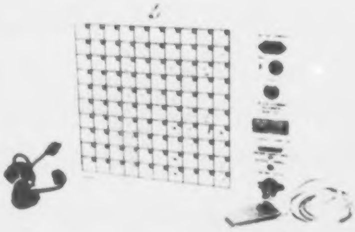
The optional Television Memory TVM-1 can be connected to the antenna terminals of any television receiver for the display of sixteen lines of 32 characters each. Messages can be displayed on the TV, permitting corrections and changes, and then the displayed text can be automatically printed on the paper tape of the strip printer, or on the teletypewriter. The TV memory can also be used as a look-up table where long words can be stored. Then instead of printing these words letter-by-letter in the normal mode using the strip printer, they can be selected and printed intact.

NON-VERBAL
COMMUNICATION AIDS
PRENTKE ROMICH COMPANY
TV MEMORY TVM-1

BLISS SYMBOL SCANNERS

Prentke Romich Company is licensed by the Blissymbolics Communication Foundation to provide communication aids using Bliss symbols. These aids are available using the 100 and 512 level vocabularies. A white plastic coated display mask is included with each unit, and extra masks can be ordered. The surface is suitable for marking with a grease pencil. The display area is 13" by 17". Either unit can be ordered with an optional built-in memory, or a separate plug-in memory unit can be added later. The memory permits storing up to 64 entries for rapid sequential display.



INFORMATION

Additional information on Bliss symbol communication may be obtained from:

Blissymbolics Communication Foundation
862 Eglinton Avenue East
Toronto, Ontario, Canada M4G 2L1.

Additional information on other aids and techniques for the severely communicatively handicapped may be obtained from:

Director, Information and Training, Trace Center
University of Wisconsin
9222 ERB, 1500 Johnson Drive
Madison, Wisconsin 53706

VOTRAX INPUT SCANNER

The Votrax Input Scanner VIS-1 is a 512 location row-column scanner designed to interface with the Votrax Handi-Voice synthetic speech generator. The latter device is available from Vocal Interface Division, Federal Screw Works, 500 Stephenson Highway, Troy, Michigan 48084.

The scanner has 512 locations and includes the standard features found in the other Prentke Romich Company row-column scanners. The unit measures 13" by 17" by 3".

ENCODING AIDS

ENCODING STRIP PRINTER

The Encoding Strip Printer ESP-1 will print one of 63 different characters (letters, numbers, etc.) after the user has activated one and then another of ten control switches. A small keyboard style switch is normally provided, and other plug-in types of switches may be used. The unit is portable, with rechargeable batteries, built-in charger, and removeable charging cord. Its features are similar to those in the Scanning Strip Printer, and the same optional accessories can be used.

DIRECT SELECTION AIDS

ELKOMI 2

ELKOMI 2 is a small calculator-style aid with a nine character lighted display. The user spells a word or message using the keyboard. The characters step across the display in order, and fall off the end. The ELKOMI 2 is battery powered and rechargeable. It can be used all day, and the batteries will be fully charged overnight. A foam lined leather carrying case and battery charger are included. The unit measures 7½" by 4½" by 2½".

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COMMUNICATION BOARDS FOR CEREBRAL-PALSIED CHILDREN

This article appeared in the *Journal of Speech and Hearing Disorders*, Vol. XXXVIII, No. 1 (February, 1973), pages 73-88.

Eugene T. McDonald
Pennsylvania State University, University Park, Pennsylvania

Adeline R. Schultz
Home of the Merciful Saviour for Crippled Children
Philadelphia, Pennsylvania

Abstract

Some cerebral-palsied children, because of severe motoric disability, are unable to develop functional speech. Often the greater their desire to communicate, the more tense they become, and the less successful are their attempts at speech. Unable to communicate, such children often become passive and dependent. They are denied the practice and experience necessary for the development of language abilities and effective social interaction. The early use of a communication board helps prevent many of these problems. The child should be evaluated physically to determine positions and movements which facilitate pointing. Intellectual and educational assessment are needed to determine board content. Content and physical layout are also discussed. Good clinical results are obtained with language boards. The children become more relaxed, and their oral responses and vocalizations increase. Phonics, vocabulary, reading, and other linguistic skills improve considerably when children are able to express their thoughts and feelings.

Speech is so essential to human life that considerable time and effort are expended in attempting to help cerebral-palsied children achieve it. For some, however, even the most determined efforts fail. Because of severe disturbances of the respiratory, phonatory, and articulary systems, intelligible or functional speech is frequently impossible or markedly delayed. This delay interferes seriously with language development and social-emotional growth. For cerebral-palsied children with any of these problems, therefore, an appropriately designed communication board should be considered. Parents sometimes resist using a communication board, feeling that this step signals a prognosis of speechlessness for their child. On the contrary, language boards provide the child with a means of two-way communication and facilitate language development. In addition to problems of preparing an appropriate communication board for the child, the speech clinician must be prepared to help the parents understand and accept this method of communication.

A survey of texts dealing with cerebral palsy gives little information to guide the clinician in constructing communication boards. The few published guides (Goldberg and Fenton; Sayre, 1963; Miller and Carpenter, 1964; Dixon and Curry, 1965) are not readily available to the practicing clinician. During the past several years we have developed a variety of communication boards and signalling methods for cerebral-palsied children enrolled at the Home of the Merciful Saviour for Crippled Children in Philadelphia. This paper describes our experiences in the form of a guide for the development, construction, and use of communication boards.

INDICATIONS FOR LANGUAGE-BOARD USE

For the normally developing child, communication is a process involving reception of language, central manipulation of the language code, and expression of language - first orally, and later in writing. The parents' response to and imitation of the child's vocalizations reinforce the child's responses and encourage more vocalization. In this way, a communication cycle between parent and child is started. Soon, the normally developing child becomes the initiator of communication; he no longer merely waits to be spoken to, but spontaneously names objects, asks questions, and eventually expresses needs, wants, and ideas.

For the cerebral-palsied child who cannot speak, the communication process is fragmented. Reception of language signals and processing of the language code may be undisturbed. However, the child's inability to express himself sets off a pattern of actions and reactions which are detrimental to his social, emotional, and intellectual development. When a child makes few vocal responses to his parents' speech they often decrease the speech stimulation they provide. His difficulty in speaking prevents him from initiating conversations or determining their direction. The physical tension associated with speaking and the difficulty in making himself understood discourage speech attempts, and the child often remains silent and uncommunicative. He is deprived of the speech-oriented interpersonal relations that contribute to social and emotional development. Lack of language stimulation retards development of skill in organizaing ideas and thinking. The early use of language boards as a means of communication may minimize these problems.

It has often been argued that too early use of a communication board will discourage the development of speech. On the contrary, our clinical work with young children using language boards shows that they attempt to vocalize words as they point to them on the boards and gradually develop closer approximations of these words. With a nonoral means of expressing himself, the child is less tense and, hence, is often able to vocalize more easily. Once the child is able to communicate effectively with his language board, he can initiate conversation, and people are more responsive to him. Thus, a nonfragmented, complete communication cycle is established.

CONSIDERATIONS DETERMINING BOARD FORMAT AND POSITION OF CHILD

Each language board must be individually developed and its characteristics based on a careful evaluation of the child's physical abilities, intellectual capacity, and educational status. In assessing the intellectual and educational readiness of the child for a language board, the clinician should consider these questions:

1. Is the child able to identify pictures or line drawings of common objects (television, toilet, cup, ball)?
2. Can he recognize simple printed words?
3. Is the child able to recognize words not in his reading vocabulary by using phonics or other word-analysis techniques?
4. Is he able to read simple phrases?
5. Is he able to sequence words and construct a sentence?
6. What is the estimate of the child's potential for developing language, word analysis skills, and reading?

Similarly, careful assessment of the child's physical capabilities is essential for development of a functional communication board. This assessment requires the coordinated efforts of the physical and occupational therapists and the speech clinician. The aim of evaluation and experimentation is to find what sitting position, what method of response, and what placement of the material will permit the most accurate and rapid response. Ideally, the child should have his head up, permitting his eyes to focus on the board, and his hands positioned to facilitate pointing. The role of posture and the influence of head and arm movements in eliciting primitive reflexes should be considered. For example, a child with a strong asymmetrical tonic neck reflex (ATNR) would have difficulty with eye-hand coordination. If he were looking at one side of his board, by turning his head to the left his arm on the left side of his board would be in extension. He would be unable to point to things near to him on the left side. The right side of his body would be in flexion, and he might be unable to point at all with his right hand. Another example would be the symmetrical tonic neck reflex manifesting itself in a flexion pattern of the arms when the head is flexed. In this instance, a child flexing his head either involuntarily or to look at a word near him would have difficulty extending his arms. Thus, eye-hand coordination would be hindered.

Some board positions elicit involuntary motion or an increase in tension when the child attempts to point. Some children have difficulty crossing the midline with one or both hands and might need to use a different hand for each side of the board. While it is usually preferable to inhibit reflex actions, it may sometimes be necessary to utilize such behavior if it is the most effective means of pointing to words on the board. However, the speech clinician should consult with the child's physical and occupational therapists before encouraging use, rather than inhibition, of tonic reflexes.

Stabilization also helps improve speed and accuracy of ponting in some children. Several types of adaptive equipment may be tried to increase stability: shoulder weights, weighted cuffs on the wrists, and restraint of the lower extremities through proper foot placement, or application of straps to limit movement. A mitt which isolates a pointing finger on the better hand might facilitate responding for some children. For those children with good trunk and head control but poor arm function, a head pointer might be used. Occasionally a child will respond best with his feet, and, in such a case, a board on which the child can indicate by pointing with his toes could be employed. In severely involved cases, eye localization may be the child's only reliable response. This child can be trained to look at specific areas of the communication board to indicate what he wants to say. A matrix system, using color and number coordinates, can be developed to facilitate this means of communication. A good physical and educational evaluation of the child will give the speech clinician a preliminary idea of where to begin; then, experimentation can help identify the optimal position of the language board and the most effective means by which the child can respond.

TYPES AND CONTENT OF COMMUNICATION BOARDS

A means of communication language boards also help the child organize and develop vocabulary, syntactic rules, and concepts needed to think and to express himself effectively. Just as the board must be individualized to meed the special motor problems of the child, the content of the boards must be specialized to meet the child's needs in different communication situations. If the content of the board is on a simple level or if space for content is limited because of physical involvement, there might be several different boards for different situations. One board may have vocabulary used more in the home, one may be for the classroom, and one may be for a dormitory of a residential school. As the child's spelling ability improves and he is able to use a more advanced board, one board might be appropriate for many situations. Rather than use the basic vocabulary of normally developing children, the early communication boards should employ a lexicon that is functional for the individual cerebral-palsied child. Such words as bathroom, brace, sick, and tired, which do not occur in the common words most children use, may be of extreme importance to the child who relies on this means of communication. The clinician should not make up the functional list alone, nor rely on a list of the most commonly used words. Rather, suggestions for the board's lexicon should come from parents, teachers, physical and occupational therapists, the child-care staff, and most importantly, from the child himself.

To the extent that the child's ability allows use of even beginning language boards, part of the content should include some items commonly used in social interactions: "Hello," "Thank you," "Please," "I'm sorry," "How are you?" "Fine," "Good-bye." Words which enable him to be polite or to apologize when appropriate will further the child's development as a social being.

Picture Boards

Before the child is ready to read any words, his expressive communication can be facilitated by the use of a picture board composed of photographs, or pictures cut from magazines or drawn on the board. The first boards might include only a few pictures, but as the child's expressive skills improve, additional pictures can be added enabling him to indicate what he wants, such as milk, toileting, television, toy, or bed; places he wants to go, such as store, church, home, physical or occupational or speech therapy, or school; pictures or caricatures of family members and pets; and pictures depicting concepts such as up, down, day, night, cold, hot, big, and little. The printed word when used under the picture has been found to aid in developing sight vocabulary. Figure 1 shows a very early picture communication board. Figure 2 illustrates a more advanced picture board.

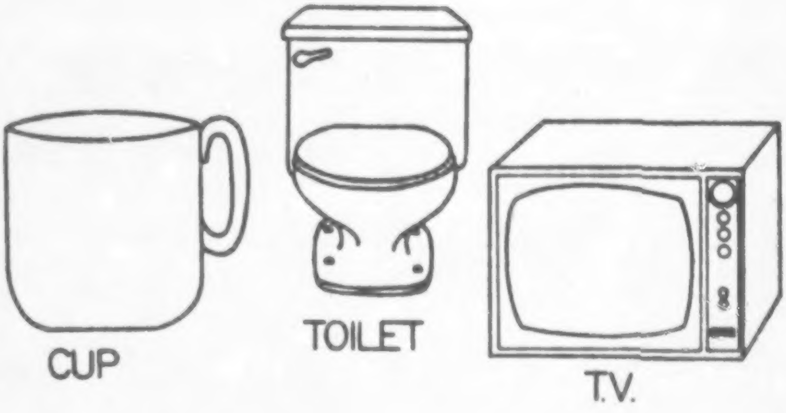

CUP
TOILET
T.V.

Figure 1. Early picture communication board.

Word and Phrase Board

As soon as the child begins developing a sight vocabulary, he should have a new board that includes printed words from his picture board plus new words he has learned to recognize. There are also many phrases to which children react almost as if they are single words. Social phrases such as "How are you?" and "I love you" might be introduced at this point and taught by their location on the board. Even though this method might appear contrary to traditional reading instruction, the child's receptive knowledge of these phrases,

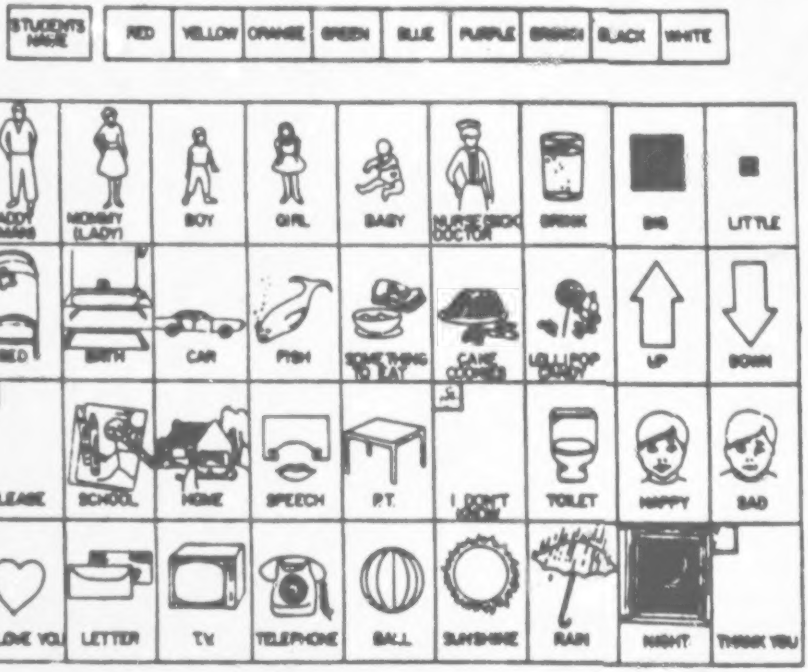
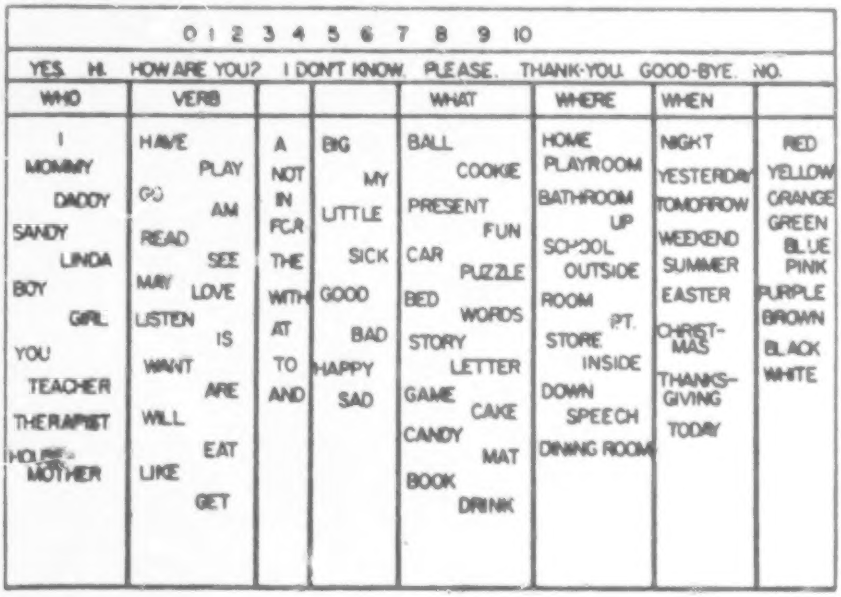

STUDENT'S NAME
RED
YELLOW
ORANGE
GREEN
BLUE
PURPLE
BROWN
BLACK
WHITE
DADDY (MAN)
MOMMY (LADY)
BOY
GIRL
BABY
NURSE (SICK) DOCTOR
DRINK
BIG
LITTLE
BED
BATH
CAR
FISH
SOMETHING TO EAT
CAKE COOKIES
LOLLIPOP CANDY
UP
DOWN
PLEASE
SCHOOL
HOME
SPEECH
P.T.
I DON'T KNOW
TOILET
HAPPY
SAD
I LOVE YOU
LETTER
T.V.
TELEPHONE
BALL
SUNSHINE
RAIN
NIGHT
THANK YOU

Figure 2. Advanced picture communication board.

reinforced by their appearance and use, helps him to learn language and reading. Thus the board stimulates his social and emotional growth. Obviously, for such interactions to occur, everyone associated with the child must make opportunities for him to use these expressions. It is not enough to give the child an opportunity to express some need. Those in his environment must structure speaking situations that will encourage him to become involved in the give and take of conversation. As the child points to each word, the person watching should repeat it to give him auditory reinforcement. Then the person should respond to what the child has said. Such colloquial expressions as "What's new?" "Sorry about that," and "See you later" should be included in the child's language board to help him become a part of the social milieu.

Boards for Sentence Construction

This board should be built around some system for teaching language structure. An adaptation of the Fitzgerald Key, designed originally for teaching language to the deaf (Fitzgerald, 1954), is useful with cerebral-palsied children who are being prepared to use communication boards. This system divides language into the following structures: "who," "what," "where," and "when" words and verbs. For the cerebral-palsied child, sentence construction can be facilitated by adding a column for articles, conjunctions, and prepositions, and another column for adverbs and adjectives. Words to be included in these columns should be selected for the child's interest, the likelihood that he may use them to communicate, the opportunities they give for creating social interactions, and the structures needed for developing basic language skills. At this stage several other features may be added as the child is ready for them. A replication of the typewriter keyboard can be used for spelling out words and as a way of preparing the child for typing. A number line facilitates expression of numerical concepts and aids in learning arithmetic. An expanded list of socially useful phrases encourages social exchanges. Yes and no, if not already included, can aid in eliciting rapid responses. Shapes and colors might be appropriate at an early stage in the use of this board. Content of an early version of a sentence sonstruction board is illustrated in Figure 3 and content for a more advanced version in Table 1.



0 1 2 3 4 5 6 7 8 9 10

YES HI HOW ARE YOU? I DON'T KNOW. PLEASE. THANK-YOU. GOOD-BYE. NO.

WHO	VERB			WHAT	WHERE	WHEN	
I MOMMY DADDY SANDY LINDA BOY GIRL YOU TEACHER THERAPIST HOUSE-MOTHER	HAVE PLAY GO AM READ SEE MAY LOVE LISTEN IS WANT ARE WILL EAT LIKE GET	A NOT IN FOR THE WITH AT TO AND	BIG MY LITTLE SICK GOOD BAD HAPPY SAD	BALL COOKIE PRESENT FUN CAR PUZZLE BED WORDS STORY LETTER GAME CAKE CANDY MAT BOOK DRINK	HOME PLAYROOM BATHROOM UP SCHOOL OUTSIDE ROOM PT. STORE INSIDE DOWN SPEECH DINING ROOM	NIGHT YESTERDAY TOMORROW WEEKEND SUMMER EASTER CHRIST-MAS THANKS-GIVING TODAY	RED YELLOW ORANGE GREEN BLUE PINK PURPLE BROWN BLACK WHITE

Figure 3. Early sentence construction board.

CONSTRUCTION AND PHYSICAL LAYOUT OF COMMUNICATION BOARD

Communication boards are usually constructed for use on a wheelchair tray rested on the arms of the chair. The size of the tray, therefore, will be determined by the size of the child's chair. For the Tiny Tot and Growing Chair, custom-made trays of about 28" x 18" are satisfactory. These are made of plywood; bolts on the tray slide into holes drilled on the side of the wheelchair.

The content may be typed on smaller pieces of paper arranged and glued on a heavy paper (such as oak-tag) insert of appropriate size. These smaller pieces of paper should be placed to facilitate the child's finding and pointing. If a child's method of indicating is not precise, then the pictures or words should be spaced far apart and glued to the oak-tag where the child can accurately indicate his choice. If the child has accurate pointing for small areas, then the pictures or typing can be smaller and spaced closer together. For all boards it is better to type the content with either primary or regular size type instead of printing the words by hand. The size of type should be determined by the child's ability to see different print sizes and accuracy of his pointing. In other words, the type size, spacing, and arrangement on the board should be individually determined for each child. During the developmental stage of a board on which material will be changed or added, it is best to cover the board with a 1/8"-thick sheet of plexiglass which may be taped around the outer edges to prevent dirt and moisture from seeping under the cover onto the paper. When boards are complete, they might be covered with clear Con-Tact paper.

Table 1. Advanced sentence construction board.

Who		*Verbs*			*Prep., Art., Adject., Conj.*	*Adverbs*		*What*		*Where*	*When*	*Social Amenities*
I		-ed			to	next	last	it	paper	room	Sunday	Hi. Hello
Child's name		-ing			in	this	these	house	typewriter	bed room	Monday	How are you?
Mommy		-en			into	that	those	ball	bed	dining room	Tuesday	Fine.
Daddy		will	was	were	if	mine	part	phone call	candy	bath room	Wednesday	Good.
Family names		am	is	are	on	my	fast	game	cake	home	Thursday	Okay.
Grandmother		has	had	have	under	her(s)	some	doll	breakfast	P.T.	Friday	That's okay.
Grandfather		do	does		for	his	slow	letter	lunch	O.T.	Saturday	Please.
boy—brother		did	done		with	their(s)	half	card	dinner	Speech	morning	Thank you.
girl—sister		go	went		from	our(s)	both	T.V.	snack	school	afternoon	You're welcome.
baby		sleep	slept		at	your(s)	full	cat	chair	playroom	night	I'm sorry.
family		eat	ate		and	clean	very	dog	tissue	restaurant	weekend	I don't know.
Aunt		get	got		a	dirty	all	ring	name	sea shore	today	Maybe.
Uncle		come	came		an	new	any	ice cream	age	farm	tonight	God Bless You.
cousin		ride	rode		the	old	funny	spaghetti	tray	movies	tomorrow	Excuse me.
you	me	see	saw		over	young	kind	drink	something	McDonalds	yesterday	I love you.
he	him	drink	drank		up	skinny	hungry	pencil	surprise	kitchen	day	Bathroom, please.
she	her	write	wrote		just	fat	many	car	record player	living room	week	I'm sick.
we	us	swim	swam		why?	long	sick	but	table	upstairs	month	Stay awake.
they	them	can	could		because	short	few	airplane	bag	downstairs	year	Mr. Miss Mrs.
teacher		find	found		out	tall		boat	money	inside	minute	See you later
housemother		make	made		around	hot		book		outside	hour	I'm not sure.
clinician		say	said		of	cold		puzzle		store	:30	I don't understand.
babysitter		be	been		but	wet		animal		church	o'clock	Not yet.
friend		fall	fell		as	dry		helmet		away	soon	I can't do it.
neighbor		grow	grew		or	sunny		crutches		here	then	I want to do it.
man		hold	held		about	rainy		braces		there	later	Good-bye.
woman		buy	bought		by	nice		class		front	now	
		know	knew		again	pretty		mistake		back	during	
		fly	flew		off	happy		toy		near	while	
		may	must		only	sad		costume		far	Thanksgiving	
		give	gave		not	good		party		up	Christmas	
		hear	heard		never	better		present		down	New Years	
		run	ran		how	best		birthday		left	Easter	
want	open	laugh	help		well	bad		flower		right	Summer	
watch	bowl	ask	look		before	dear		dress		pool	Fall	
love	put	cut	wait		after	dark		panties		park	Winter	
kiss	borrow	talk	cry		-n't	light		shoes			Spring	
walk	pretend	let	learn		-'s	big		socks				
play	add	read	brush			little		bathing suit				

Several variations of language board arrangements have proved useful for individual children. For children who can point accurately only in a limited area, the material can be placed in one section of the board as illustrated in Figure 4. For children whose range of movement is limited but who are better at crossing the midline, the board might be placed at an angle and the corner cut off the tray. Cards which may be flipped easily permit inclusion of as much material as might have been included if the entire board had been available. For other children, particularly those using headsticks for pointing (Figure 5), it is not feasible to arrange material in the area close to the body. As illustrated in Figure 6, the material can be arranged around the periphery of the board to facilitate the child's pointing. For the child who is ambulatory, a hinged language board (Figure 7) made of heavy paper or pieces of formica may be used as a base. When the two inside panels are laid flat, it has the same arrangement as a regular language board.

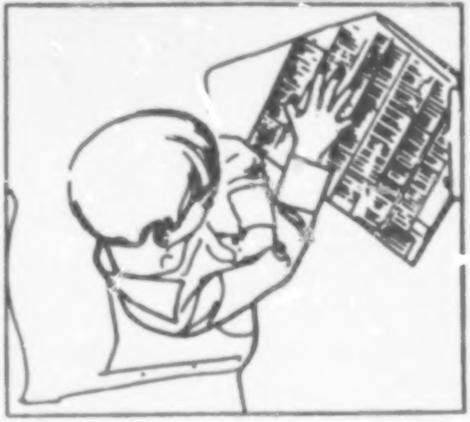


Figure 4. Placement of communication board for child with restricted range of movement.

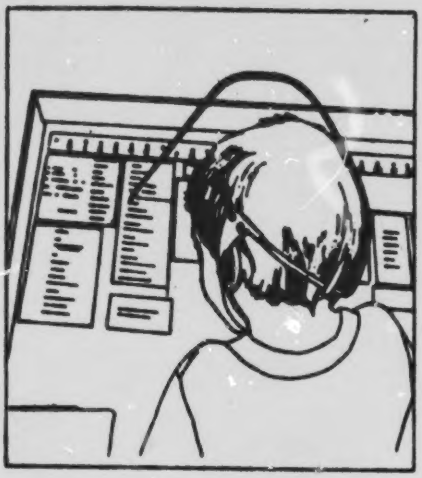


Figure 5. Using headstick for pointing.

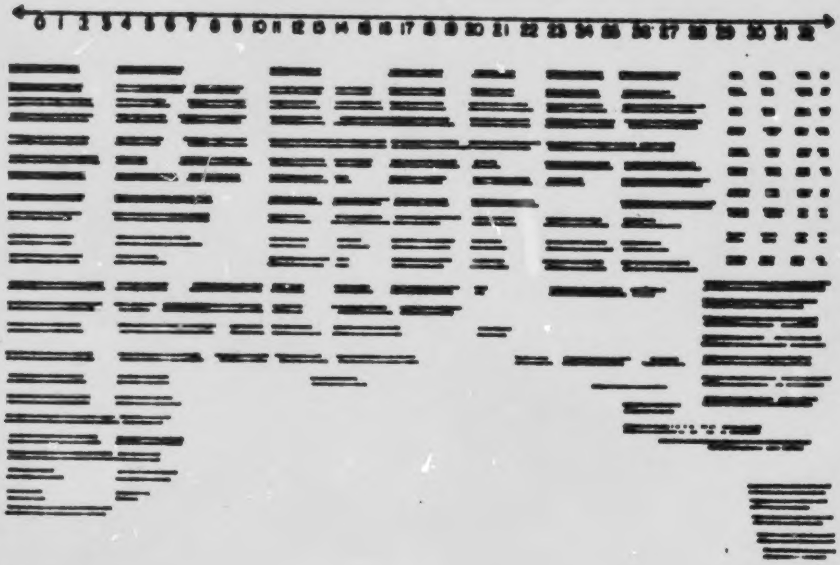


Figure 6. Arrangement of material on communication board for children with restricted movement.

(See Figure 8.) After the language material has been glued onto the base, it should be covered with clear Con-Tact paper. For the child who is so involved that only eye localization is an accurate and controlled response, a matrix system language board can be used. Shown in Figure 9 is a five-block by five-block matrix; the columns are numbered from one to five and the rows are colored red, blue, yellow, orange, and green. In each cell is a picture, a word, or a phrase. The matrix is placed in the center of the child's tray. Along the outer edges or rim of the tray are colors and numbers spaced far apart. When the child wants to communicate something, he finds it first in the matrix to see what number column it is in and what color row it is in. Then he looks first at the color and then at the number. The receiver names the color and the number that the child is looking at and then finds it on the matrix. For instance, in the drawing, if he first looked at

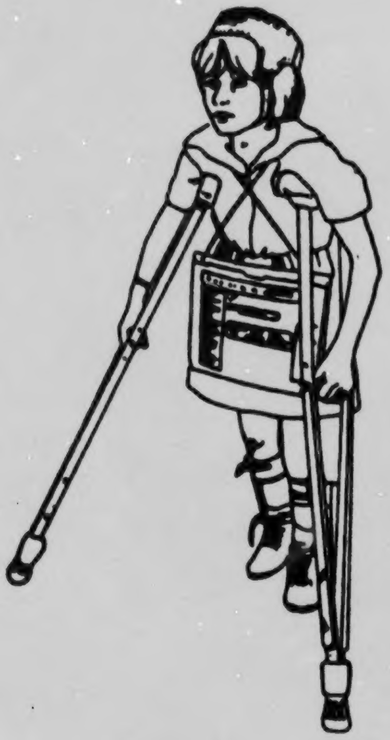


Figure 7. Hinged language board for ambulatory child.

red and then at five, he would be indicating that he wanted to go outside or inside. In addition to the phrase matrix, the child might have an alphabet and a number matrix.

ROLE OF OTHERS IN COMMUNICATION

For communication to take place between the child and another person, the other person (parent, teacher, clinician) must understand how the child uses the board. Since such communication is slow, the other person must also be willing to give the child the time he needs to express himself. In our residential setting it has been helpful to conduct an in-service training program for all staff members on the development and use of different types of communication boards. When a child gets a different type of board, it is important to demonstrate for those persons with whom he wants to communicate how he uses it. It is especially important to demonstrate for parents the child's use of his communication board and to give them supervised practice in "talking" with the child by this means.

CASE REPORT

These procedures can be illustrated by describing how a severely involved child learned to use a communication board.

Kenny, a six-year old athetoid cerebral-palsied child, came to the school a year ago. He was very pleasant, happy, and motivated to learn new things. He became upset, though, when people could not understand what he wanted to say.

On the Pictorial Test of Intelligence, he showed above average intelligence, and his teacher felt this estimate was accurate. Kenny had no self-help skills. His trunk was

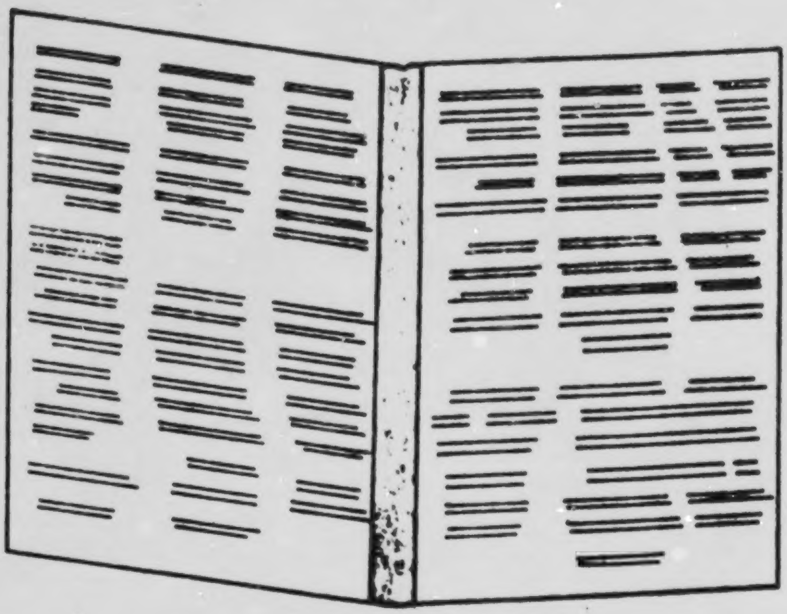


Figure 8. Hinged language board when opened.

very weak, and he had poor hand and arm control. Asynchronous breathing, laryngeal blocks, and several infantile oral reflexes including a strong biting and suckle pattern were present. His lip closure was poor and he drooled. On some expirations Kenny could produce only one sound. At other times he could not initiate phonation. In all attempts at vocalization, he struggled. No consonant sounds were present, and there was little differentiation

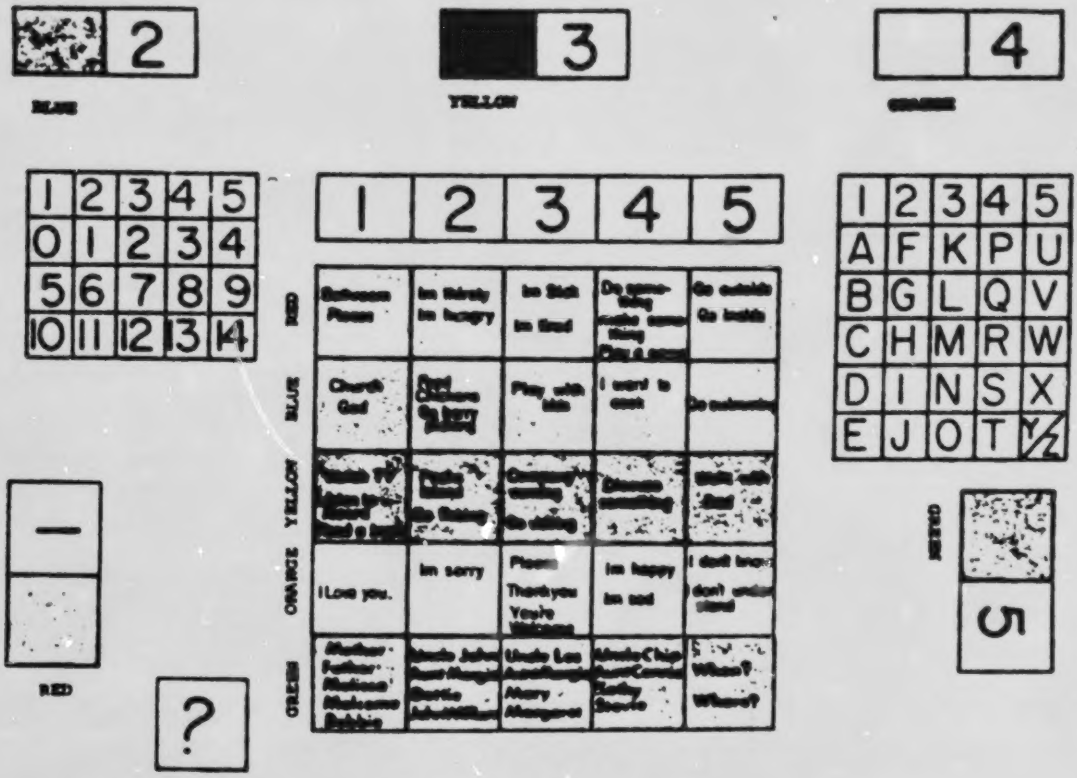

2
BLUE
3
YELLOW
4
1 2 3 4 5
0 1 2 3 4
5 6 7 8 9
10 11 12 13 14
1 2 3 4 5
RED
BLUE
YELLOW
ORANGE
GREEN
Im thirsty
Im hungry
Im Sick
Im tired
Go outside
Go inside
Church
God
Play with
I want to
I Love you.
Im sorry
Please
Thankyou
You're Welcome
Im happy
Im sad
I don't know
Uncle John
Uncle Lee
When?
Where?
1 2 3 4 5
A F K P U
B G L Q V
C H M R W
D I N S X
E J O T Y/Z
GREEN
5
—
RED
?

Figure 9. Matrix communication board.

of vowels--in short, his vocalizations were totally unintelligible. Kenny, however, had a good "yes" response by smiling and nodding his head, and a "no" response by slightly skaking his head.

Based on our preliminary evaluation, we felt that Kenny had sufficient intelligence and muscular coordination to make use of a picture language board, provided the squares were sufficiently large that he could point with his fists. A removable 28" x 18" tray was attached to his wheelchair. Pictures of different objects to indicate his needs (drink, home, toilet, television), symbols to represent places (school, speech, physical therapy), and other symbols to represent concepts (in, out, up, down, hot, cold, night, day) were drawn on 2" x 3" pieces of paper, which were pasted on the tray insert. The corresponding word was printed under each picture. When Kenny first received this board, the speech clinician made sure he was familiar with all the pictures and the concepts represented by the pictures. As expected, he could put his fist on these large squares and, although Kenny's responses were labored, the clinician could tell where he was pointing. At first, the clinician would name a picture and Kenny would point to it. Then Kenny would point to a picture and the clinician would name it. He would nod if she had gotten the right one. Then some needs would be communicated by asking Kenny questions answerable by "Yes" or "No," such as "Do you want a drink?" Kenny would nod yes. He would then be shown pictures to which he could point to get his idea across. Finally, the clinician might say, "Kenny, tell me what happened last night." Kenny would point to the picture of Mommy and the picture of a telephone. The clinician would say, "You got a telephone call from Mommy last night." Kenny would nod yes. Clinician: "Did she tell you anything special?" Kenny would point to the picture of home and the picture of the heart, indicating "I love you." Clinician: "She told you that you were going home this weekend and that she loves you." Kenny nods, very happy and excited.

While working on Kenny's picture board, the physical and occupational therapists and speech clinician were experimenting with adaptive equipment such as a trunk girdle, mitts, and headstick, to see if faster, more accurate responses could be achieved. Simultaneously, in the educational program, it was becoming clear that Kenny could ultimately handle a sophisticated language board if more accurate pointing were possible. Finally, using a trunk girdle and headstick within limited areas of the board permitted Kenny to achieve accurate pointing. This permitted the incorporation of much more content. Kenny was then given a board with phrase units, beginning vocabulary (those from the picture board with some additions), a number line, blocks for yes/no responses, the alphabet with a typewriter keyboard arrangement, and a column for social amenities. Therapy using this board was started by teaching some social amenities. He learned how to initiate conversation by pointing to "Hi, how are you?" The speech clinician, after repeating what he had pointed to, would say, "Fine, and how are you?" Kenny would point to "I'm fine, thank you." He began pointing to "May I have a drink, please?" Asked if he wanted something, he would point to "Yes, please" or "No, thank you." He started to use these social phrases in the dormitory and the housemothers showered him with kisses and reinforcing approval. Kenny learned sentences and phrases to which he might point for telling news and needs. However, communication with this kind of board is limited because the sentence and phrase units are fairly stereotyped. While working on these phrases, the speech clinician and teacher also stress phonics skills. We expect that eventually Kenny will be able to spell, at least phonetically, any words that are not on his board.

Kenny is now working on a sentence construction board. The clinician first pointed out some basic words and the columns in which they are found. Immediately he was shown the sequence for simple kernel sentences and was asked to repeat the sentences. The clinician would point to and say, "I have a ball," and then have Kenny point to the words of the sentence in the correct sequence. As Kenny pointed to each word, the clinician would say it, and then repeat the completed sentence with normal rhythm and inflection to give Kenny the auditory reinforcement. Other kernel sentences are now being taught, such as "I have a (book, car, sister, Mommy)"; "I want a (book, car)"; "I am a good, bad, happy, big) boy"; and "I go to (speech, school)." Other sentences teach new vocabulary, such as "The boy is (eating, sleeping, writing)." These kernel sentences, once firmly grasped, can be transformed into negatives and questions. Syntactic rules underlying these and more complex transformations are taught. As with the picture board, the clinician first teaches the concept and then Kenny is shown how to form sentences for his own communication. As Kenny gains more skill in using the board and his language ability becomes more comprehensive, more words may be added to the board to enable him to express increasingly abstract ideas. Spelling skills are also being emphasized to assist Kenny in conveying ideas not on his board. As with all work, Kenny is asked to try to pronounce each word as he points, and the clinician repeats it after him.

SUMMARY

The two most important factors in evaluating a cerebral-palsied child's readiness for a language board are his physical abilities and intellectual/educational development. The language board facilitates social interactions, language development, and organization of thought and ideas. It gives the child an effective means of expressing himself, lessening communicative tension so that more vocalizations take place. Most important of all, it reduces the frustration felt by the child and those in his environment. He becomes self-actualizing and responsive within the limits of his handicap.

Equally important for the speech clinician working with cerebral-palsied children is the simplicity of language boards. The materials needed for their construction are inexpensive and easy to work with. Language boards for cerebral-palsied children are not available commercially and probably never will be, because the most effective language boards must be developed individually for each child. All that is needed is the tray, some heavy paper, a few graphics supplies, plexiglass or other clear washable covering, and, most of all, the ingenuity of a creative clinician.

ACKNOWLEDGMENT

Adeline R. Schultz is now affiliated with the Moss Rehabilitation Hospital in Philadelphia. Requests for reprints of this paper should be addressed to Home of the Merciful Saviour for Crippled Children, 4400 Baltimore Avenue, Philadelphia, Pennsylvania 19104.

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APPROACHES TO NONORAL COMMUNICATION

Nancy T. Harlan and Faith Carlson

To discuss the topic of nonoral communication one must begin by reviewing some pertinent terminology. The term _language_ implies knowledge of the rules of a linguistic system. _Speech_ refers to the spoken; that is, voiced and articulated output (expression) of language. _Communication_ refers to the transmission of information. One can communicate by both oral and nonoral means. This paper will deal with nonoral communication systems. Some of these have a linguistic basis (written language, sign systems, Blissymbolics, Rebus symbols, Premack-type systems). Others (real objects, pictures, gestures, and mime) do not.

Speech pathologists work with children and adults exhibiting a wide variety of speech and language problems. For some, oral communication will be extremely difficult, if not impossible. It is the speech pathologist's professional responsibility to provide every child with whom he or she works some form of communication. Bearing this in mind, nonoral and oral communication need to be explored.

Language should be viewed as a system for talking about what is known. On the basis of cognitive rules linguistic rules are built. In order to communicate a child must have learned about people, actions, objects, and locations of people and objects in terms of time and space.

Nonoral communication for some may be only a temporary means of communication. That is, it may be used only until oral communication (speech) becomes more functional and natural. For others it may be viewed as a long-term means of communication. Generally, it is wise to think of nonoral approaches as augmentative devices rather than alternative forms of communication. Although limited, clinical observation and research have shown that nonoral approaches have not inhibited the acquisition of speech. They often enhance it.

Nonoral Communication Mediums

The choice of a particular nonoral medium of communication should be based upon a number of considerations in regard to the child and parents. These will be discussed later in the paper. For the present, a brief review of some of the nonoral mediums of communication is in order. Manual systems that bear consideration are signed English, esoteric sign systems, fingerspelling, gestures, and mime. Signed English uses English syntax.

It is a rapid succession of signs which generally covers the content words of an English utterance and some of the function words. Fingerspelled words as well as signs are usually included in a sequence of signed English. A child's manual dexterity must be considered when deciding whether to choose signs as his/her medium of communication. Esoteric sign systems consist of made-up signs. The problem with such a system is that the signs are understood only by the small group which initiated their use. Gestures, as a means of communication, are concrete and "guessable." They have no linguistic constraints. Like gestures, mime has no linguistic basis. The movement in question is exaggerated by the entire body.

Other symbol systems are those which involve real objects, pictures, Blissymbolics, Rebus symbols, Premack symbols, and the printed word. The most concrete of these uses real objects or toys. These can be positioned where the child can secure or indicate them to communicate what s/he wants. For example, a child can obtain or point to a cup to indicate that s/he wants a drink of water or to a spoon to indicate that s/he is hungry. Such communication takes the child to a representational level, beyond direct acquisition of the desired object. Photographs of real objects or pictures such as those from a magazine can be another medium of communication. A child must understand picture/object matching for such an approach to be effective. In some cases such understanding has been developed through the use of pictures as communication. Pictures are concrete. It is difficult to communicate more abstract concepts through their use. Another disadvantage is that a child is confronted with many pictures in the environment which are not for the purpose of communication. Blissymbolics are an additional nonoral medium of communication. This medium has a number of advantages. The printed word always appears under each symbol. Thus, reading nonsymbol users can communicate with symbol users. Many of the Bliss Symbols are pictorial in nature; they look like what they stand for. There is a meaning/symbol relationship as opposed to the sound/symbol relationship which occurs with the printed word. This appears to aid a child's learning them more readily than words. One symbol stands for a number of meaning units; categorization skills are enhanced. Abstract concepts and grammatical units can be represented. Because the Bliss Symbols can be combined, a child's communication system can be expanded. Rebus symbols are also a consideration for nonoral communication. Two more abstract mediums of communication are Premack symbols and the printed word. All two-dimensional symbols are accessible by a number of methods, depending upon a child's motor abilities. For more detailed information about the various nonoral communication systems, note appropriate references in the bibliography.

Could An Individual Benefit From Nonoral Communication? - Considerations

In order for an individual to make use of a nonoral system of communication, s/he must be sufficiently aware of his/her environment. This can be determined in part by observing the child's interaction with common objects and toys. Does s/he mouth or bang all objects? Does s/he use them appropriately him/herself? Does s/he employ them correctly in his/her interaction with other play things and people? For more information in this regard, note the article by Chappell, cited in the bibliography.

An estimate must be made of the child's listening and understanding skills. Does s/he respond to sounds and associate a sound with the object which produces it? Does s/he understand his/her own name? Does s/he understand the names of body parts, familiar people, objects, and actions, as well as positions and emotions? Another consideration is the level of abstraction that s/he is able to deal with: real objects only, actual photographs, colored pictures, line drawings, symbols or the printed word. How does the child follow commands? Single words may need to be coupled with an environmental cue (i.e., the presence of a chair paired with the directive "sit down"), a gestural or facial cue, and/or a tactile cue. Perhaps the child can respond appropriately to single words given alone. At times only phrases and/or sentences that are used repeatedly with the child may be meaningful to him/her. A much greater understanding is present if the child follows any given phrases and/or sentences. Consideration should then be given to the length and complexity of phrases to which s/he does respond.

Become aware of the child's expressive communication skills. How does s/he communicate his/her wants and needs, i.e., hunger, thirst, being tired, wanting a particular toy, sickness, happiness, sadness, anger? What types of communication does s/he use, such as looking toward the item s/he wants, pointing toward it, rolling toward it, crying, whining, etc. It is important to note whether s/he has a way to communicate yes and no.

To substantiate the need for a nonoral system of communication, a child's oral-motor and breathing skills should be noted. If it is not possible to directly evaluate the oral-motor skills, a parent interview can provide information on eating skills which can give clues about problems in this area. It is important to note if and when the child drools. A description of his/her tongue and lip movements as well as chewing patterns is important. A child who can imitate mouth movements shows some facility in the use of the oral mechanism. One who eats only soft foods, chokes often, and drools much of the time is evidencing poor oral-motor skills. The same is true of a child who tends to thrust the tongue forward when eating as opposed to using it to move the food from side to side. A child who can scream in long bursts or say a number of sounds on one breath is evidencing some positive signs of the good breath support needed for oral communication. One should remember that oral communication does not always result, even though oral-motor skills may be intact.

A child may appear to possess greater cognitive skills than communication skills. S/he may communicate via other means when oral communication, because of cognitive and/or physical reasons, is not possible. When this is the case, a nonoral approach should be considered. A child who evidences good receptive language is a better candidate for nonoral communication than one who does not.

Employing Nonoral Communication

The selection of an appropriate vocabulary for the child is most important. It should come from the child's immediate environment--the objects, activities, and people which are of interest to him or her. The vocabulary must be words which the child can use frequently.

The medium of communication chosen for a child depends upon the degree of abstraction s/he is able to deal with (real objects, pictures, Blissymbolics, the printed word, etc.). Each medium of communication is composed of symbols, i.e., real objects, pictures, Bliss Symbols, and printed words are all symbols.

Symbols should always be introduced as a means of communication, never in a structured drill-type setting. At least two symbols should be presented at once so that the child is communicating a choice. Remember that massed practice out of the communication process does not generalize. Parents need to understand and use this communication process with their child. Before introducing it the technique and rationale should be explained so they are in agreement with its use. All of the child's associates need to communicate with him/her like s/he is expected to communicate with them. For example, they should point to the symbols as they talk to him/her just as s/he is expected to point to them as s/he communicates. Speech or any vocalization the child can produce should always be encouraged simultaneous to the child's indicating a symbol.

When deciding upon the type of symbol display for a child, his/her level of language development should be considered. At the very lowest level would be the stimulation phase, whereby symbols would be actually attached to or label the objects they stand for. This labelling should occur in the child's home as well as at his/her school. As the teacher and mother interact with the child, they should point out the symbols, say their name, and relate them to the object. The next level of complexity calls for the grouping of a few symbols on a device or in an appropriate area in a room where the child can easily refer to them. The third level of complexity makes available the possibility of two-word combinations, such as "me drink." Symbols should be grouped into categories, i.e., people together and objects together. Groupings of symbols of increasing complexity are designed to form first simple sentences and then complex adult-type sentences. Words should still be categorized, such as under the headings of *people*, *action*, *modifier*, *object*, *place*. Note the Pugh and Fitzgerald references in the bibliography. A left-to-right sequence should be fostered; that is, subject first, then action, then modifier, then object. Each of the categories can be color-coded to make them easier to locate. Once a display has been made for a child, the arrangement of items should be altered only when the child is ready for more complex communication. Thus, symbols will be easier to find. Spaces should be left for the addition of new symbols as they become needed in the child's vocabulary. A child might have a different display for different settings. For example, s/he might have one for school, one for when s/he is in the car, and one for when s/he is at home. Displays should be changed or modified as the child's vocabulary expands and needs change. Any communication display should take into consideration a child's visual acuity so that the size of symbols can be properly chosen. Symbols should be spaced so that the child can point to them or in some way access them easily. Any communication display should be attractive, one which the child will be proud of.

The VanderHeidens (note references in the bibliography) refer to four ways in which a child can access a symbol on a display: (1) direct selection, (2) scanning (as when the listener points to the symbols, and the child indicates *yes* or *no*), (3) encoding (the child, for example, indicates a series of numbers or letters which in turn refer to a given column and row), and (4) any combination of the above three. A variety of devices can present a symbol display. Such might be plexiglass or plastic carrying cases, plexiglass boards for placement on wheelchair trays, aprons for the speaker or listener, placemats, tags on key rings or photo albums. Electronic devices may facilitate communication with children who have severe motor problems. Some of the devices involve a sequencing light which can be started and stopped in a number of ways. The electronic equipment also offers more detailed communication to the individual with advanced language skills.

The formation of a group of children who use nonoral communication can be an effective means for developing concepts and providing experiences the children might not otherwise have. Play boards and modified toys which aid the child's grasping objects and manipulating hard-to-hold objects can also provide new experiences for the children.

Nonoral Communication - Why Does It Work?

Nonoral communication often enhances speech and language skills and there are speculations as to why it does. First and foremost, it removes the pressure for speech. With some children the problems of short-term auditory memory and general auditory processing problems will be circumvented because visual representation is possible. The language input is simplified and the vocabulary is limited and functional. Also, the rate of presentation is adjustable. Although this point bears more research, there may be value in a multimodel presentation of information. Nonoral communication is a viable alternative to speech and should be considered in facilitating the communication skills of the physically or cognitively handicapped child.

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AVIOR MANAGEMENT

A DISCUSSION OF BEHAVIOR MODIFICATION PROCEDURES AS APPLIED TO THE SEVERELY AND PROFOUNDLY HANDICAPPED

Dvenna Duncan

A survey of the severely and profoundly handicapped population would find children with two distinctly different types of behavior. Some members of this population are so passive and nonresponsive that one would describe them as almost having no behavior. These individuals, if laid on a mat at 8 a.m., would likely still be lying in the same position at 8 p.m. if they were not tended to. They exert virtually no control over their environment, being fed and tended to on a time schedule completely under the control of their caretakers. The other group of individuals who would be considered severely and profoundly handicapped have an excess of behaviors. These individuals are constantly moving, although most of these movements would be classified as self-stimulatory and can be self- and other-destructive. They have a great deal of control over their caretakers, but this control is achieved in a socially unacceptable way and often it does not immediately result in the desired environmental change by the child. As we apply the behavioral principles to the severely and profoundly handicapped, we need to keep these two distinct behavior types in mind.

With both types of behavior patterns, the first goal of the trainer is the establishment of stimulus control over some behavior. A stimulus exerts control over behavior whenever rates or probabilities of responding vary as a function of the absence or presence of that stimulus in the environment (White, 1971). This control is gained much easier over a behavior which is in the repertoire of the student. By using a behavior which the trainer knows the child can perform, the trainer is eliminating the possibility of failure because the child was physically unable to perform the required behavior. In this paper the author will focus on four means of establishing this stimulus control: positive reinforcement, negative reinforcement, punishment, and extinction as they are related to the severely handicapped. Because of their general lack of receptive or expressive communication skills, one must be much more precise in applying behavioral principles with this population. These individuals, unlike their more "normal" peers, cannot deduce what one might have meant; hence, trainers cannot explain through the use of language why they are being reinforced or punished.

Positive reinforcement is the delivery of a consequence which is pleasant to the behaver during emission of a desired behavior. If trainers reinforce after the behavior, as is recommended in many tests, they are actually reinforcing the cessation of the behavior. However, the trainer must take care to reinforce an actual behavior, not the absence of behavior. One should not positively reinforce an individual for not head hitting. If one wishes to use positive reinforcement to eliminate head hitting, s/he should choose an imcompatible behavior such as a task requiring hand manipulation and reinforce that behavior. The most crucial variable in using positive reinforcement with severely and profoundly handicapped persons is the speed of the delivery of the reinforcer. If the behaver does emit another behavior before the reinforcer is delivered, the trainer will be reinforcing the behavior closest to the delivery of the reinforcement, not the behavior which was planned to reinforce. This is especially critical with the overactive child, as this intervening behavior is very likely to be a self-stimulatory or other undesired behavior. If in a program the child does occasionally emit intervening or simultaneous undesired behaviors before the trainer is able to deliver the reinforcer, the trainer should explore delivery systems or other types of reinforcers which would be more convenient and faster. Until this is accomplished, it is better to skip an occasional reinforcement opportunity than to reinforce the wrong behavior. Because intermittent reinforcement causes behavior which is most difficult to extinguish, the trainer must constantly guard against the intermittent reinforcement of undesired behaviors.

Another hurdle in the use of positive reinforcement with the severely and profoundly handicapped is the choosing of a reinforcer. The natural occurring reinforcers have not worked. These individuals cannot tell us what they like, and the usual textbook recommendations of how to choose a reinforcer are inappropriate. The trainer will have to experiment with reinforcers within programs and make judgments as to what is reinforcing by observing what works with the individual child. Reinforcer choice must be specific to each child. Reinforcers also vary according to programs. Different reinforcers may be more effective for different types of instructional programs. Thus, one would not choose the same reinforcer for every instructional program in a student's educational plan (Duncan, 1976).

There are many avenues to explore in the choice of reinforcers. Reinforcers fall into six categories, five aligning with the senses (gustatory, olfactory, visual, auditory, and tactile) and a sixth which appeals to the behaver's sense of movement (proprioceptive). There is a strong reliance on food as a reinforcer in gaining stimulus control with the severely and profoundly handicapped. Several factors encourage us to explore the use of other reinforcers. Feeding problems are a major source of frustration in working with the severely and profoundly handicapped. Dysmorphologists are also discovering more and more syndrome causes of mental retardation which are due to inborn errors of metabolism. The calorie use of very inactive children is so low that extra food adds to potential obesity problems. This is a special concern for the nonambulatory patients who must be physically lifted and moved by attendants. Extreme obesity also interferes with therapy programs and possible self-ambulation.

The author questions whether food is reinforcing to the severely and profoundly handicapped. We associate many pleasant social and life situations with food. Dinner is a major social event in many families. If a man wishes to show a lady a very nice evening, he most likely starts it out with a romantic dinner in a fine restaurant. If we wish to entertain someone well, we never forget to include something to eat. These associations may not hold true for the severely and profoundly handicapped. Eating is many times difficult, done alone, and accompanied by a frustrated feeder.

Observations of this population indicate that a hug, a swing, a pat on the back, or activites or movement may be more desired than a small bite of food. By observing the activities of the more active members of the population, the trainer may be able to use the Premack Principle to establish reinforcers. The choice of reinforcers with this population certainly needs a great deal more exploration. All reinforcers should be accompanied by verbal praise in order to establish verbal praise as a viable reinforcer because it is more natural and more readily available in the environment.

If a learning program is not working, check the reinforcer first. Perhaps it really is not reinforcing to that individual. By definition, for a reinforcer to be considered effective, the behavior must be increasing.

Different reinforcement schedules are more appropriate for the various stages of learning. The use of 1-1 or constant reinforcement is recommended when a new behavior is being taught. However, if carried beyond the acquisition stage, constant reinforcement can produce a behavior which extinguishes very easily when not reinforced every time. By moving to an intermittent reinforcement schedule after the acquisition stage, the trainer can help to avoid this consequence. This movement from a constant to an intermittent reinforcement schedule must be done gradually. Changing from a 1-1 to a 1-20 schedule will extinguish the behavior before the child has a chance to receive another reinforcement. A more efficient method may be 1-1, 1-2, 1-4, etc. Actual patterns of change will be discussed in the section "stages of learning."

Negative reinforcement differs from positive reinforcement in that it gives the individual an opportunity to remove an adverse consequence by performing a specific behavior. When using negative reinforcement, the trainer must carefully watch the data on his/her program to see if the reinforcement plan is effective. It is possible that the consequence chosen as aversive is actually positive for the individual being worked with. One program the author has used with negative reinforcement involved holding a student's head in position until an eye contact response was achieved and then letting go for five seconds. For this student, the program was effective because she did not like to be touched around the face. However, for other students, the holding of the face may have been positive and may have reinforced noneye contact behavior. Negative reinforcement is used to increase a behavior. If the behavior is not increasing, the consequence must be evaluated to see if it is really negatively reinforcing to the individual. Negative reinforcement may be chosen to establish initial stimulus control if an effective positive reinforcer cannot be found but consequences the individual does not like are known. After using this consequence to establish stimulus control, one then can explore effective positive reinforcers.

Punishment has some similarities and some differences from negative reinforcement. The same consequence may be used in both cases, but the method of application is different. Punishment is the presentation of a consequence during the emission of an undesired behavior in order to decrease the probability of the reoccurrence of that behavior. Again one must be careful to administer the punishment during the behavior, not on the cessation of the behavior. There are two basic ways to deliver this punishing consequence: an aversive stimulus may be delivered, or a desired stimulus may be taken away. The difference between negative reinforcement and punishment, therefore, lies in what happens to the behavior. In negative reinforcement one is desirous of increasing a desired behavior, and in punishment there is an attempt to decrease an undesirable behavior.

When using punishment, the data must be watched carefully to be certain that the consequence is punishing. If a program using punishment is not showing progress, one should immediately question the effectiveness of the punisher. What the trainer feels is punishing may actually be reinforcing to the individual. There are also a number of side effects that can take place in a punishment situation. The individual may become frustrated if s/he does not completely understand the consequences and may choose to do nothing. Thus, the trainer has created a passive child who exhibits no behavior. There is also a tendency to associate punishment with the punisher. This effect can carry over to programs which are not being maintained with a punishing consequence. The trainer can remedy this situation by always pairing the punishment of an undesired response with the positive reinforcement of a different incompatible desirable response. An example of this would be the delivery of a positive reinforcer for social playing to a child who was being punished for hitting other children. This procedure is particularly necessary if one chooses to punish self-stimulatory behavior. Many times severely and profoundly handicapped individuals have no other behaviors, and behavior building techniques must be used to shape positive behavior in order to reinforce it. Various behavior building techniques which have been found to be effective with this population will be discussed later in this paper.

Even with the negative side effects of punishment, there are times when it may be a necessary procedure. One should explore the effectiveness of punishment when the individual is emitting behaviors which are injurious to him/herself or others--in other words, behaviors which must be stopped as soon as possible. Examples would be head banging, eye gouging, throwing objects at others, running into streets, and hitting others.

Extinction is another method of eliminating undesired behaviors. When using an extinction procedure the trainer arranges the conditions so that the individual is removed from all chances for reinforcement for the undesired behavior. The trainer may choose simply to ignore the behavior, turn away, and withdraw all attention, or may use the more extreme extinction procedure of removal to a time-out situation, thus removing the individual from all things which may be reinforcing. The procedure to be used must be evaluated according to the behavior and the total situation. When using extinction, one must be sure to control all of the reinforcers. It is especially difficult to do this in classrooms where the children are socially oriented. The trainer may withdraw his/her attention, but the individual may be getting a great deal of attention from peers. In this case a trainer may choose to remove the child to a time-out situation.

The use of extinction may not be effective with self-stimulatory behaviors, unless they are being maintained by some social consequences, as one may merely be giving the individual more uninterrupted time to self-stimulate. Many self-stimulatory behaviors may be maintained by the reaction they receive, e.g., the child may only receive attention when the caretaker is stopping the self-stimulatory behaviors. Thus, they are really not self-stimulatory but attention getting. Self-stimulation will be discussed more thoroughly in the section entitled "self-stimulatory behaviors." When this is true, the behaviors will react to extinction.

When using extinction the trainer must be aware of the extinction curve. When extinction is first initiated to eliminate a behavior, the rate of the behavior will immediately increase as the individual tests to see just what is happening. If not aware of this phenomenon, the trainer may jump to the conclusion that the procedure is not working and may begin to attend to the behavior. The trainer has, in effect, put the child on a longer intermittent reinforcement schedule. This makes the behavior more resistant to extinction in the future, as intermittently reinforced behavior is then resistant to extinction. This effect must be carefully explained to parents and aides so that intermittent reinforcement of the behavior will not occur while they are working with the individual. If this is not done, the procedure may lead to the individual's situationalizing and increasing the emission of the behavior away from the controlled setting. This may cause frustration on the part of both the individual and the caretakers.

Also, when the decision is made to use an extinction procedure, one must make sure that it can actually be done under all circumstances. Can the behavior really be totally ignored? If the answer is no, then extinction is probably not the method of *choice. An example of a poor extinction procedure is to put an* individual in a time-out room at 4 p.m. for throwing tantrums when that individual's bus leaves at 4:10 p.m. If the tantrum does not stop in 10 minutes, the tantruming must be attended to while the individual is removed from the time-out situation and put on the bus. The individual really should be left in the situation and alternate transportation arranged. The latter is not always possible. If it is not possible, perhaps time-out should be avoided, as it may increase temper tantrum behavior near the end of the day. An individual should only be removed from a time-out situation when the undesired behavior has ceased. When s/he is removed from the time-out situation, it should be done with as little interaction as possible. However, strong positive reinforcement should be given for the individual's next positive action. If one gives reinforcement merely for coming out of the time-out situation, one is directly giving reinforcement for going there in the first place, because the child could only receive the reinforcement because s/he had gone to time-out.

As with punishment, positive reinforcement of desired behaviors should always accompany the use of the extinction and time-out procedures.

With all of the procedures discussed, one must use a regular measurement system which will reflect the progress of the programs. Only through the analysis of this data can one tell if the programs are really working.

Behavior Building Techniques

Throughout this paper the author has discussed the reinforcement of desired behaviors. However, these behaviors have to be emitted before they can be reinforced. For example, if a meal was placed in front of a passive severely handicapped individual and s/he was told to "eat," and if the trainer waited for the behavior to occur before reinforcing it, we likely would end up with a starved child.

The methods for shaping behavior in the passive individual are very different from the methods used for the active individual. With the active individual one may be able to shape an existing nonpurposeful or even undesired behavior into a desired behavior. With the passive individual it is possible that the trainer will have to create movement. This movement can be shaped from previously involuntary behavior (Fuller, 1949).

There are several ways the trainer can shape the desirous behaviors. When deciding which method to use, the following may be taken into consideration:

1. Do you have stimulus control of the child, i.e., if you give him/her a cue, will s/he attend to the cue and attempt some behavior?

2. Does the child have imitation skills? Research shows that imitation skills are a prerequisite to observational learning.

3. Is the desirous behavior in the behavior repertoire of the child? Have you ever seen the child emit the behavior in either program or free operant time?

4. What are the receptive language skills of the child? Does s/he understand what a command is?

5. How important is the skill? Can you wait for it to occur naturally and then reinforce it or must you cause the behavior to occur?

Behavior can be shaped by the use of successive approximations to the goal behavior. By using this technique an individual can be taught to act in a manner in which s/he has seldom or never before acted by rewarding successive steps to the final goal behavior.

These steps can be broken down in two ways. The behavior can be analyzed into its prerequisite skills, the prerequisite skills taught, and blended into the final behavior. For example, shoe tying can be taught by teaching the child to grasp a string, to put it through a loop, to pull the string, etc., until all the behaviors necessary in shoe tying are taught. It is not necessary that the behaviors be taught in the order in which they are actually performed in the task. This method helps to determine if there is a specific prerequisite skill which the individual cannot accomplish. If this is true, this skill must be either taught or substituted for before the entire behavior can be performed.

It is also possible to choose to work on the whole behavior at once and to reinforce successively closer attempts at a correct behavior. For example, in teaching the scooping of food, first any movement of the spoon toward the food may be reinforced, then the spoon may actually have to touch the food before reinforcement, etc. Progression would be made in this manner until the food was scooped onto the spoon and moved to the mouth. While proceeding in this manner careful records must be kept to ensure that better and better behavior is being required of the individual before a reinforcer is earned. Preplanning can aid in this. The topology of the desired behavior usually will guide the choice between these two methods.

Time can also be a factor in the use of successive approximations. When first beginning an eye contact program, the requirement may be that the child only makes fleeting contact with the trainer's eyes. This may be gradually increased until the individual must remain in eye contact a period of time before receiving reinforcement. However, the required time should never be more than five seconds, as that is all that is necessary to begin to attend to a task. Again, careful data and preplanning is a necessary ingredient.

Unfortunately, bad behavior can also be shaped through the unintentional use of successive approximations. If an individual who is eating begins to bang his/her spoon on the table and no one attends, s/he may bang harder. If s/he is attended to when this harder banging occurs, the next time s/he wishes attention s/he may begin with the previously reinforced loudness of banging. This would quickly shape the child to bang the spoon louder and louder.

Prompting is another method of behavior building which is very useful with the severely and profoundly handicapped. Prompting is the adding of an extra stimulus to elicit the desired behavior. This stimulus may be either verbal or physical. However, because of the lack of communication skills in these individuals, physical prompting is most often used. Prompting is sometimes referred to as priming or cueing.

It is important to prompt only as much as is necessary and to have a careful plan for the fading of the prompt. It is the author's experience that severely handicapped individuals tend to "hook" on the prompt, and may actually wait for the prompting stimulus before emitting the behavior. Prompts can be faded by forward or backward chaining. When using backward chaining, prompt the beginning of the behavior and release the individual to finish the behavior on his/her own. The advantage here is that the reinforcer comes at the termination of both the action of the individual and the actual behavior. This is clearly advantageous in feeding programs, as the reinforcer is built in, with the individual actually delivering the food to the mouth on his/her own. When using this method one must be watchful for indications that the child is trying to perform the behavior on his/her own. When using a forward chaining procedure, let the individual perform as much of the behavior on his/her own as s/he can and then prompt to the finish. Here is where the author has experienced a great deal of "hooking on the prompt." The individual will get to the previously prompted point and then wait for the prompt to finish the behavior.

No matter which method of prompting is used, careful data must reflect the presence or absence of improvement in the amount of behavior the individual is emitting on his/her own. A long period of lack of progress toward the fading of the prompt should encourage the trainer to examine other procedures for the teaching of the behavior.

Discrimination tasks may be taught through the use of a fading procedure. When using this procedure the correct object is placed near the individual and the distractor is placed at some distance. The individual is given the cue and reinforcement is given for touching the correct object. As success is achieved, the distractor is gradually moved closer and closer to the correct object until they are side by side. A fading procedure could be used when teaching the use of a fork for fork food. The fork would be placed in position next to the plate and the spoon at arm's length. Reinforcement would be given for picking up the fork to eat. As the data indicate success at one level, the spoon would be moved closer and closer until it is next to the fork and the fork is chosen. The fading procedure should be carefully planned in advance.

When using fading on two-choice discrimination tasks, care must be taken to randomly switch right-left positions of the two objects. Otherwise the individual may be taught to choose the object on the left or the object on the right rather than the desired stimulus match. This position hooking is very common among the severely and profoundly handicapped.

When teaching a behavior which the child has never exhibited before one may have to shape the individual through the entire behavior. Chewing would be a good example where this procedure is necessary many times. While shaping an individual through this behavior the trainer manually manipulates the individual's mouth to emit the chewing behavior. Again, while manipulating the trainer must always be alert for the child's attempts to do it him/herself. Also, as a voice of experience, watch your fingers while you are doing this particular task. Other behaviors, such as walking, crawling, etc., may be amenable to this physical shaping procedure.

A final method for behavior shaping is modeling or demonstrating. Here the trainer shows the individual the desired behavior and then gives the individual a cue to "do this." This procedure assumes that the individual is capable of repeating an action s/he has observed (i.e., observational learning), and it may be beyond the capabilities of many of these children. The trainer may want to work toward this goal by modeling and then use one of the other procedures discussed to cause the individual to emit the behavior. Learning to learn from a modeled behavior should be a major goals with the severely handicapped, as observational learning is such a powerful tool of the normal person.

In conclusion, after choosing a behavior to be taught, one must reflect on the considerations mentioned earlier: Does the trainer have stimulus control? Does the child have imitation skills? Is this behavior in his/her behavior repertoire? What is his/her receptive language? How important is this skill? The answers to these questions will determine the behavior-buidling technique. By being alert to the behavioral principles earlier discussed and by keeping careful data throughout the program, the trainers are able to successfully teach skills to the severely handicapped

Self Stimulation

If the author were to ask students in a typical special education course to define "self stimulation," their answer would most likely be something like, "Self-stimulation is repetitive acts engaged in by the severely retarded or emotionally disturbed." The author would agree that self-stimulatory acts are usually repetitive, but they are not limited to the retarded and/or emotionally disturbed. We all engage in self-stimulatory activities. We twirl our hair, click our pens, tap our feet, play with our keys, etc. What makes our self-stimulatory activities different from those of the retarded and emotionally disturbed is that they are socially acceptable, actually because socially acceptable people say that they are socially acceptable, and we are still, in most cases, able to attend to the task at hand.

So even though we all self-stimulate, it is still a major goal of the trainer to reduce the self-stimulation rates of the retarded and emotionally disturbed. First, their rather bizarre looking self-stimulatory activities make them less socially acceptable than they could be, and second, they do not attend to tasks as well when they are engaged in self-stimulatory acts (Berkson & Mason, 1964; Lovaas, Lebrownik & Mann, 1971).

To begin with, the author will present an operational definition of self-stimulatory activity. Self-stimulatory activity or stereotype refers to highly consistent and repetitious motor or posturing behaviors, the adaptive consequences of which, if any, are not immediately apparent (Baumeister & Forehand, 1970). Thus, the key elements are that it is repetitive and that it seems to have no immediate consequences.

The rest of this paper will only consider those self-stimulatory behaviors which are found in the retarded and/or emotionally disturbed and are maladaptive or pathological. Because of these frequent movements the individual may be condemned to an institution. These would be such movements as rocking, eye poking, head banging, face slapping, hand flapping, etc.

There are several postulated causes for self-stimulation. These will be explained briefly because the true purpose of this paper is to relate how to remediate self-stimulatory activity. Nevertheless, as they may lend cues to possible remediation, it is useful to explore some of the theorized causes. The incidence of self-stimulatory behavior is probably increased by the interaction of many variables--environmental restriction (Warren & Burns, 1970) and noise level and hunger (Kaufman & Levitt, 1965; Levitt & Kaufman, 1965; Amsel, 1958; Berkson & Mason, 1964) to mention a few. Situations in which goal-directed behavior is frustrated also produce an increase in self-stimulatory activity (Forehand, 1970). It has also been found that an increase in environmental stimuli can decrease self-stimulatory activities.

Perhaps a certain amount of stimulation is necessary to the human organism. If it does not come from the outside, it may have to come from within. Most students support the view that decreased external stimulation leads to increased self-stimulation.

There is also a theory that self-stimulatory behaviors are operant behaviors and have been conditioned. Hollis (1968) contends that repetitive movements, however bizarre and repugnant to onlookers, can function as operants for prolonged time periods. If they are operant behaviors, one of the following conditions could be present. Either the behavior is cued by some stimulus and ultimately becomes reinforcing, or perhaps the self-stimulatory behavior has become conditioned by a consequence to which the outsider is unaware. Self-stimulatory behaviors do obey the basic principles of learning (Baumeister & Forehand, 1970).

1. They can be shaped.
2. Contingent positive reinforcement increases their rate.
3. Contingent aversive consequence decreases their rate.
4. Different schedules of reinforcement produce different rates of self-stimulation.
5. Self-stimulation can be brought under stimulus control.

Baumeister and Forehand also state the self-stimulation decreases through the use of the extinction procedure. I contend that when extinction does work we have a different type of behavior which looks like self-stimulation but is used for an entirely different purpose. These two types of behavior will be discussed in the remediation section.

Remediation

Before discussing remediation the author will explore two types of behaviors which both have similar outward characteristics. They both look like the types of behaviors which we have previously defined as self-stimulatory, e.g., hand flapping, head banging, etc. Some of these behaviors actually are self-stimulatory; however, a great many such behaviors are used for the purpose of getting attention from adults and others around the individual. It does not take a very long observation of the mentally retarded or emotionally disturbed for the observer to notice that a self-stimulatory behavior usually brings an adult to the side of the behaver very quickly. In fact, in many institutional living and even school and home situations many times the emission of a self-stimulatory behavior is the only way such attention can be gained. This attention comes especially quickly if the self-stimulatory behavior is also self-destructive. Therefore, before beginning a program for remediation of self-stimulatory behaviors, one must observe carefully both the antecedent conditions and the consequences of the behaviors in question. The author recommends that the following data collection system be used.

Behavior	Location	Those Present	Activity Engaged in	Consequences

After these data have been collected for several days it is possible to begin effective remediation of the behavior. The remediation will consist of manipulating those behaviors which seem to be consistent with the behavior. For example, a teacher who kept this chart recently found that every head hitting behavior occurred in large groups where the student was unfamiliar with the surroundings and the procedures necessary to those surroundings. By preparing the student for large group activities by familiarizing him or her with the area, the teacher was able to eliminate head hitting behavior. Another teacher found that eye poking brought an immediate distracting activity from the teacher. Since these distracting activities were those which were very reinforcing to the student, they in turn reinforced the eye poking activity. By presenting these reinforcing activities when the student was not eye poking, the teacher decreased the rate a great deal.

All the teachers who have used this method of recording the data on self-stimulatory behavior have found it to be most useful in discovering the antecedents and consequences of the behaviors in question.

Some of the most effective techniques have been to ignore the self-stimulatory looking behavior and to teach the individual a new method of getting attention. The use of a bell or buzzer for nonverbal individuals has eliminated a great many "self-stimulatory" behaviors. Another effective method is to program the day so that the students do get attention other than when they are engaged in undesirable behaviors. The resultant decrease in the undesirable behaviors will give the teacher much more programming time during the day. In order for any of these methods to be effective, they must have the cooperation of the daily care staff of the individual, whether these are institutional personnel, group home parents, or their own parents. Only consistent effort will be successful.

Sometimes charting of the behavior does not produce any consistent antecedent or consequent events. Other times the manipulation of seemingly antecedent and consequent events does not produce resulting changes in the rate of the behavior. In these cases we may be dealing with behavior which is truly self-stimulatory. This is usually a more difficult problem to remediate.

Extinction is probably not the method of choice. The use of this procedure gives the individual more uninterrupted time to engage in the self-stimulatory activities. A careful examination of cases where "self-stimulation" has been decreased through the use of extinction would very likely turn up a consistent consequence before the use of the extinction procedure. Overcorrection or autism reversal has been an effective procedure for remediation of true self-stimulatory behavior (Azrin, 1973). This procedure requires that the subject perform at the direction of the experimenter a behavior in opposition to the usual stereotyped pattern. Noncompliance with the direction results in negative reinforcement, compliance results in positive reinforcement. While this procedure has produced outstanding results with true self-stimulatory activities, care must be given not to use it with the attention-getting type behaviors as the manipulation required during the procedure results in individual attention.

Mulhern and Baumeister (1969) demonstrated the use of contingent primary reinforcement for nonperformance of rocking behaviors and showed a significant decrease in the rocking behaviors. However, one of the problems in the study was lack of introduction of a more appropriate substitute behavior; the alternate for stereotyped rocking was merely not rocking, rather than an alternate movement cycle. Consequently, the subject moved to engaging in other inappropriate activities. The subject moved to another inappropriate behavior (body posturing) during the study and was still reinforced for not rocking.

Several other authors have avoided the problem stated above by giving the reinforcement for emission of an appropriate behavior that is incompatible with the self-stimulatory behavior rather than for the nonemission of the self-stimulatory behavior. Allen and Harris (1966) reported a study where a child was reinforced for all behaviors which were incompatible with a scratching behavior. Generalization data on this study showed that four months later the scratching behavior still had not reoccurred. This procedure has also been successfully employed by several other experimenters (Peterson & Peterson, 1968).

Punishment has also been used to try to eliminate self-stimulatory behaviors. This procedure is usually used on behaviors which are self-destructive and the trainer feels that the behavior is of danger to the child or others around it.

In a study by Lovaas and Buchner (1968), the introduction of shock in the treatment of self-destructive behavior had dramatic results. However, when only one experimenter administered the shock, the generalization effects were poor. The introduction of another experimenter increased generalization. Other studies using shock for self-destructive behaviors have shown successful immediate results (Tate & Baroff, 1966; Risley, 1968). In discussing the application of shock as a training procedure, Osipova (1926) stated that retarded children respond more rapidly to shock then do normal children.

However, there are several arguments against the use of shock. Spellman (1976) reported that the effects of shock were not long lasting and after a period of time the undesired behavior would return even though the shock was continued. There are also the legal and ethical considerations. Many school districts and institutions do not allow the use of aversive procedures to eliminate behaviors. There is also a tendency for the student to associate the punishment with the punisher, thus causing problems when the same person who punished tries to give positive reinforcement at other times.

The most effective technique for the elimination of the undesired response and the generalization of the pattern seems to be the reinforcement of incompatible behaviors. Sometimes these students appear to engage in no incompatible behaviors which to reinforce. When this appears to be the case, the behavior building techniques discussed in the earlier portion of this paper will have to be used to shape these incompatible desired behaviors. When the student has something to do which will produce outside reinforcement, s/he is most likely to engage in the self-reinforcing activities.

Thus, the most important steps to consider in programming for the reduction of behaviors which appear to be self-stimulatory are:

1. Chart the antecedents and consequences of the behavior.
2. Determine if there are any consistencies among either.
3. Manipulate those consistent antecedents or consequeces.
4. If #3 does not work, try to reinforce incompatible behavior.
5. If there are no naturally occurring incompatible behaviors, shape them.

Stages of Learning

When programming learning for the severely handicapped, one must be mindful of the several stages of learning. The author has identified those stages as follows:

1. Acquisition
2. Criterion building
3. Maintenance
4. Generalization
5. Transfer

Other authors identify other stages and in other orders (Haring, 1977). However, the author has found that in programming for the severely handicapped the above model is very effective. First the author will define the five stages.

Acquisition means that the student has never independently performed the behavior. For example, s/he has never raised his or her arm or pointed to the red square. Criterion building means that the student has independently performed the behavior but has not met the criterion for successful performance which has been identified in the learning goals. Once the student performs the behavior one time independently, s/he has moved from the acquisition stage to the criterion building stage. The maintenance stage means that the student is learning to perform the behavior on lower frequencies of reinforcement and for social reinforcement alone. The generalization stage means that the student is learning to perform the behavior in different situations, with different teachers, and with different cues. The transfer state means that the student in learning to perform the behavior within his or her daily life. For example, s/he has learned to put on his or her coat and now is learning to do it when going outside and s/he is cold without a cue from a trainer.

Different learning plans are appropriate for each stage of learning. At the acquisition stage the student must be reinforced for any emission of the behavior with primary and social reinforcement (unless primary reinforcement is not needed by the individual student as indicated by other programs). Prompting and shaping are necessary with each cue. The methods for doing this have already been discussed. Again the author cautions the reader to be alert for times when the prompt should be decreased. The learning program looks as follows:

Cue-----prompt-----behavior-----social and primary reinforcement

If learning is not taking place the manipulation should come in the cue and the prompt.

The criterion building stage is where the most difficulty seems to arise in programming. At this stage the student has already demonstrated that s/he can perform the activity independently. Therefore, there must be a payoff for his or her independence. In this stage the cue is given and the teacher waits for a response. If the student responds independently s/he is given primary and social reinforcement. If s/he does not respond independently, s/he is prompted and given social reinforcement only. Thus, the learning program looks as follows:

individual response---primary and social reinforcement
cue
no response---prompt---behavior---social reinforcement only

If the learning program does not show an increase during this stage, the manipulation takes place in the reinforcement. Perhaps your reinforcement is not strong enough to induce an independent response.

During the maintenance stage the most important goal is to reduce the level of reinforcement. The goal is to reach the level where the behavior will maintain on an intermittent reinforcement schedule as this schedule more closely approximates true life situations. First the teacher begins to fade the primary reinforcer. This is done by first giving the primary reinforcement every other time that the response is emitted correctly, while still giving the social reinforcement every time. When the responding is stable at this rate, the primary reinforcement is faded gradually to an intermittent schedule while still giving the social reinforcement each time. Care must be taken to fade gradually or the extinction principle will take effect. One would not jump from a 1-1 to a 1-20 schedule. After the primary reinforcement is on an intermittent schedule and the performance is stable, the teacher then begins to fade the social reinforcement in the same way. The maintenance stage is finished when the student is on an intermittent schedule with social reinforcement only.

During the generalization stage the teacher begins to vary different parts of the program. While during the earlier stages it was important to be consistent in cues and conditions, it is now important to teach the student to perform under inconsistent surroundings. In other words, we are teaching him or her to perform in the real world.

The transfer stage involves teaching the student when it is appropriate and when it is not appropriate to use the behaviors s/he has learned. This ability must also be taught. Situations must be devised and the student reinforced or not reinforced according to whether the behavior was used appropriately. This is a very important stage as it has been noted by many trainers of the retarded that the children know how to perform the behaviors, but they do not perform under proper circumstances and without many cues from the teacher or other adults.

By careful attention to the consequences and antecedents of behaviors and the stages of programming learning tasks, we can see remarkable learning take place in children and adults who are labeled as severely handicapped.

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BEHAVIOR MANAGEMENT OF THE SEVERELY/PROFOUNDLY HANDICAPPED CHILD

Jack Harris

This paper will review basic concepts, principles, and procedures for the management of behavior in any situation with any type of handicapped person. The first topic addressed is perspectives on relationships, discipline, and punishment. I feel it is important to review this topic before going to the actual management of behavior because relationships, and one's view of discipline and punishment, are affected by attitude and communication skills, and attitude and communication skills are known to affect any behavior management system.

The second topic addressed is preventing behavior problems. This topic is vital to the management process because it is far better to prevent behavioral problems than to treat them after a period of mismanagement. The last topic is changing behavior. This is a difficult topic which involves technical nomenclature and procedures that are difficult to master in a one-day workshop. As a matter of fact, if you are unfamiliar with the concepts and procedures requisite to a sound behavior modification program, you will not be a fully accomplished changer of behavior when you return to your school. If you are just beginning your study of behavior modification, you will have to be patient with yourself and be willing to try out ideas and make corrections over a considerable time period.

Relationships, Discipline, and Punishment

In my review of perspectives on relationships, discipline, and punishment, I'd like to remind teachers they have signed contracts that impose a relationship over an extended period of time, so teachers must look at their choices for this relationship, of which there are three: the choice to be positive, the choice to be indifferent, or the choice to be negative. What one finds in a typical classroom setting is that the teacher translates all three choices from time to time. It is rare for a teacher to choose to promote a positive relationship throughout the contract period. The second topic is role relationship crystallization, which can best be understood by an example of a teacher who promoted a role of pal with his students and the students in turn promoted a role of pal with the teacher. By mid-semester the roles had crystallized along the line of pal, and hence there was no one in charge to give the assignments and no one to maintain order in the classroom. This unfortunate teacher lost his job at mid-term.

Regarding the interrelationship between discipline and development, consistent discipline on the part of teachers and parents is interrelated with either positive or negative events in the life of a child or student.

Consistent discipline provides for a predictable environment, which in turn provides for feelings of security, and this in turn provides for a centering of energy. It is very necessary for one to be able to center energy in order to accomplish relevant goals, and relevant goals are related to feelings of good self-esteem.

Inconsistent discipline provides for an inordinate amount of tension and anxiety, which in turn constricts the energy-centering process. When students are unable to center energy, relevant roles are difficult to accomplish; this often results in crime, unemployment, welfare, mental illness, or at the very least a decided sense of irresponsibility.

Next I would like to discuss some concepts about punishment. First I'd like to share with you the basis to most of our negative behavior.

There is a tendency to punish through the use of one or more punishers when another person is not working up to our expectation. The punisher chiefly used is scolding or verbally berating the other person. A sufficiently agitated person might hit the other person, which sometimes happens on the part of parents and teachers. The negative alternative concept will be developed later in greater detail. Punishment does have some positive purposes, which are: (1) to suppress negative behavior, (2) to clearly communicate that limits have been exceeded, and (3) to provide a basis for appreciating positive approaches when they are presented. There are some principles that should be observed when using a punisher. A punisher should be carefully selected so that the need for future punishment is reduced. The person being punished should have clearly understood the correct behavior desired. The punisher must be one that does not teach escape and avoidance behavior, and the punisher should not model aggression.

These are some of the key concepts that govern relationships and some of the major concepts and principles about discipline and punishment. These have only scratched the surface, but they are some major concepts that should be very useful to you upon your return to your classroom and even to your homes.

Preventing Behavior Problems

The second major topic of this paper is preventing behavior problems. This topic will be addressed by describing a series of steps.

Step One: State Your Relationship Goals

Step One is designed to bring the relationship goals that the teacher wants into sharp focus. The relationship goals should be based on ideas and concepts discussed previously. As an example, I would like to give you my relationship goals:

1. I want a warm, positive classroom environment that supports student achievement.
2. I want positive rather than negative cycles of behavior in my classroom.
3. I want my psychological needs to be met by my students when I am interacting with them.
4. I want students to learn to accept responsibility for their behavior.
5. I want a correct crystallization of roles for my relationship with students.

Also, the teacher should carefully review the real motive for teaching, i.e., has teaching been chosen as a career to meet power, status, or service needs?

Step Two: Identify Your Needs

The second step is for teachers to identify those needs that students must meet. This step recognizes that needs will either be met or not met depending on whether the teacher has done an adequate job of identifying and communicating them. Table 1 was prepared to help the teacher identify basic needs. After studying Table 1, I suggest that the teacher think more specifically in terms of identifying student behaviors that make the difference in teaching success--or feelings of success. For example, many teachers get frustrated when students do not raise hands before speaking out; other teachers simply cannot tolerate gum chewing; other teachers need to have all assignments completed, particularly homework assignments.

An important point in this step is that teachers must remember that they are human beings with psychological needs that, if met, allow them to feel reasonably good about themselves and if not met will create symptoms such as:

1. Increased time in teachers' lounge.
2. Increased trips to medicine cabinet or doctor's office.
3. Increased dependency on alcohol or tranquilizers.

Table 1

Examples of Teacher Needs

ORDER	PSYCHOLOGICAL	STUDENT ACHIEVEMENT
Teachers need students to:	Teachers need students to:	Teachers need students to:
Raise hands to talk	Attend to teacher's lectures and conversations	Finish assignments
Work with reasonable quiet	Talk with teacher	Do neat, legible work
Be in room at bell	Smile at teacher	Work on tasks (try)
Be reasonably still during work sessions	Praise teacher	Learn with drill
Have all materials ready for assignment	Attend school	Retain information
Minimize demands for attention	Refrain from obnoxious behaviors directed toward teacher	
Refrain from verbally abusing others	Observe habits of cleanliness	
Refrain from physically abusing others		

4. Increased absenteeism (This is the most serious symptom of all, i.e., when the teacher begins to call in sick on a regular basis. The author, while serving as a director of special education, had one teacher who started out the year with one or two absences a month and by January was calling in sick six to eight times per month!).

5. Increased isolation of certain students.

This last symptom is perhaps the most common. Teachers who are in mild difficulty with one or more students in the classroom often isolate the student--psychologically by systematically ignoring him/her. Physical isolation is another way of responding to someone who does not meet one or more of the teacher's needs. The author is convinced that this behavior is an unconscious or subliminal type of hitting back at the student.

Readers who would like to explore psychological needs in greater depth are encouraged to take the Edwards Personal Preference Schedule. This instrument may be administered and scored by the teacher. It provides information about 15 need variables. In all probability one can take this instrument through an arrangement with the school counselor or psychologist.

Step Three: Identify Major Student Needs

The third step in preventing behavioral problems is to identify some major psychological needs of students that only the teacher can meet. Table 2 was prepared to assist the teacher to identify major student needs. Needs listed under the headings of Achievement, Psychological, and Social, have been gleaned from student polls. The author is confident that any teacher who successfully meets the majority of these needs will be able to prevent most classroom behavior problems.

The author, in his visits to classrooms, has been amazed to see how often teachers fail to meet basic psychological needs of students. It doesn't cost that much in terms of effort--it is simply a matter of teachers' being aware that during that time period they are the only ones who can meet certain needs of the group with whom they are working. Since student needs are so important, the author would like to review symptoms that students present when their basic needs are unmet:

1. Increased out-of-seat behavior/restlessness.

2. Increased off-task behavior.

3. Increased requests for restroom privileges.

Table 2

Examples of Student Needs

PSYCHOLOGICAL	SOCIAL	ACHIEVEMENT
Students need:	Students need:	Students need:
Good classroom environment heat, cold air regulation, control of insects, varmits, control of humidity, control of noise, interruptions	Time to talk with others	Assignments to be given clearly
Achievement of relevant goals	Opportunities for activities	Instruction to be planned
Unconditional positive regard of teacher and others		Instruction and work pace to be individualized (more success than failure)
Clear communication of behavior limits		Time to assimilate new material
Humor		
Understanding		

4. Increased somatic complaints, i.e., headaches, stomachaches, and similar kinds of pains expressed to the teacher and others.

5. Increased absenteeism.

Teachers are encouraged to be watchful for these symptoms and to be equally alert in anticipating and meeting the basic needs of students.

Step Four: List Specific Behaviors That Meet Needs

This step asks teachers to prepare a list of behaviors that will meet the most important needs of the teacher and the class. The behaviors listed should represent two to five needs of the teacher and two to five needs of the students. The number of needs are restricted in order to keep the program simple; also, it has been found that learning to meet two to five needs quickly generalizes to many others. Teachers should keep the behavior list handy as a constant reminder of their relationship obligations to the students and vice versa. Some teachers solve this problem by listing the behaviors on a large poster and displaying them in some prominent place in the classroom. Other teachers write the behaviors on the chalkboard for two or three weeks at the beginning of a new class and then periodically review them thereafter by taping them to the top of their desks.

Two points should be emphasized when listing behavior needs of the teacher and students: (1) The behavior list should be truly representative of the major needs of both parties, and (2) striving to meet the needs of others should be stressed as a worthy and sincere undertaking. Occasionally the author encounters teachers of junior high and high school students who express skepticism about using the principles and procedures of behavior modification described here. Apparently they believe their students to be too old for such procedures. As a point of reassurance, behavior modification does work with any age group if given a chance and is systematically implemented. Often teachers express skepticism about positive management approaches without seriously investigating them. They seem fixated at a negative relationship level and exhibit cynicism.

Step Four is a crucial part of the communication process between teacher and student. It clearly demonstrates to the students that the teacher cares, understands, and desires a positive relationship. However, the teacher must stress carefully that the behavior of the students is more important than their feelings (Glasser, 1965).

Step Five: Stress Antecedents

This step recognizes the importance of certain antecedent behaviors on the achievement of students. For example, a hierarchy of antecedent behaviors must be met before the teacher can successfully teach any of the academic subjects. The most basic antecedent behavior is, of course, the child's attendance. The next most basic antecedent behavior is that of being in the right area in school, i.e., in the classroom as opposed to being out in the hall, on the campus, or in the gym. If a child is at school and in the right place at school, then it is important for the child to be in a working posture, i.e., at a work area with the appropriate materials such as paper and pencil. The next most basic antecedent is that of working on tasks or the assignment that was given. The last and perhaps most important antecedent behavior of all is that of completing tasks or assignments.

To stress antecedent behaviors such as those described above, the teacher must praise and reward students who exhibit them, especially during the early part of the school year.

Step Six: Arm Yourself

This step involves two activities which, if carried out successfully, will distinguish the aggressively positive teacher from the more traditional one. The first half of this step involves making a list of positive alternatives that are appropriate to use in your teaching situation to reward those students who are engaging in behaviors that meet one or more of your psychological needs.

Table 3 indicates the hierarchy of positive alternatives one can use in a relationship to either keep the relationship going or to change certain behaviors in that relationship. Social reinforcers are the most numerous and easiest to dispense of all. As will be pointed out later, they are also the easiest to misuse and can easily promote incorrect behavior. According to Becker et al. (1971), privileges and activities (Tables 4 and 5) are the next most powerful positive alternatives available for maintaining and changing behaviors in a relationship. However, the author would like to share an observation regarding teachers' use of privileges and activities in the classroom: few teachers take the time to list those privileges and activities that are available to them in their particular classroom setting. Most teachers seemingly use a very restricted list of privileges and activities during the course of the school year. This suggests that teachers, like most parents, forfeit most of their power to manage contingencies in a positive way.

Table 3

A Hierarchy of Positive Alternatives

SOCIAL REINFORCERS

Smiles, eye contact
Name addressing
Verbal praise
Touching, pats, hugs

PRIVILEGES

ACTIVITIES

TOKENS

Primary:	Food	Phone Privileges
	Shelter	Car Privileges
	Clothing	Trips
	Money	Camps
	Dating	College
Secondary:	Points	
	Stars	
	Chips	
	Checkmarks	

Table 4

Examples of Privileges That Might Motivate Students To Meet Psychological Needs of Teachers in Classroom

Free Time in Class

Run an Errand

Assist Teacher

Teach Class for a Short Time

Do a Special Project

Go to Library

Go to Playground, Lunch, Gym Five Minutes Early
or at Least be First to Leave Room

Table 5

Examples of Activities That Might Motivate Students To Meet Psychological Needs of Teachers in Classroom

Draw, Paint, Doodle

Play at Chalkboard

Play a Record

Read a Book, Magazine

Watch TV

The last positive alternative available to teachers and parents is tokens. There is a consensus that tokens, if chosen and implemented correctly, have the greatest potential of all positive alternatives for influencing behavior. Two types of tokens are shown in Table 6. I am aware that many behaviorists will take issue with several of the primary tokens listed. Phone privileges, car privielges, money, dating, trips, camps, and college attendance are listed as primary tokens because they represent psychological survival, which is every bit as important as physical survival. The reader will recall that most anything relating to physical survival can be adapted for use as a primary token.

After the reader has made a list of positive alternatives, it is most important to commit them to memory so they can be readily used in Step Seven that follows.

The second part to Step Six involves making a list of negative alternatives that are available to the teacher to use with those students who are not showing enough compatible behavior to work with.

Table 7 shows a hierarchy of negative alternatives that begins with scolding. Scolding and/or hollering, as I prefer to call it, is the easiest negative alternative to dispense. A visit to most any American home or classroom will show how readily this negative alternative is used. After scolding, the next most dispensable negative alternative is one of withholding privileges. Most parents and teachers find this is a rather effective punisher and disciplinary tool. Even more powerful than scolding and withholding privileges is the use of isolation. Isolation and withholding a privilege, however, are a little difficult to use in that they require some policing effort on the part of the parent or teacher using them. For example, if a child is told he cannot watch TV for the evening, someone has to be alert to see that the punishment is carried out. The same is true if a teacher tells a child to remain in at recess or after school. A possible bad side effect is the resentment that can occur when the teacher or parent too has to give up a privilege in order to enforce the punishment of isolation or privilege withholding.

If isolation[1] is to be used, be sure the isolation setting (where the child is to be isolated) has been prearranged for use. For example, know before using isolation how the child will be removed to the isolation area. Also know how stimulation in that area is to be controlled. Remember, the object is to get the child to focus on the incorrect behavior for which s/he is being punished.

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[1] Some school districts have built small isolation rooms in several of their classrooms and have found them to be effective for elementary students, but much less effective for junior high and senior high students.

Table 6

Examples of Primary and Secondary Tokens That Might Motivate Students to Meet Psychological Needs of Teachers in Classroom

SECONDARY	PRIMARY
1-10 Points	Lunch
	or
or	Recess
	or
1-10 Ticket Punches	Candy
	or
	Gum
10-20 Teacher Initials	
	or
or	
	Good Friday Letter with
Stars	Possible Home Reward
	of
1-10 Tokens	Money
	Ice Cream
	Phone Privileges
	Dating Privileges
	Family Auto
	Special Trip
	or
	Special Activities of Student's Choosing
	or
	Certificate of Merit

Table 7

A Hierarchy of Negative Alternatives

Scolding

Withholding Privileges

Isolation

Physical

3 9

The technique for getting the child from the room to the isolation area with a minimum of verbiage should also be rehearsed. This is most important if the child is to focus on the incorrect behavior for which s/he is being punished. Excess verbiage during the act of punishing a child often creates so much resentment toward the one mouthing the words that the reason for the punishment is pushed into the background.

Physical punishment is the most powerful negative alternative of all. It is usually represented by some type of spanking or containing effort. For example, in instances where a child stiffly resists isolation, some type of physical effort is required to get the child to the isolation room and an additional physical effort is required to contain the child while in the place. The reader is reminded of three major points regarding the use of physical punishment. First, if physical punishment is not used sparingly and correctly, it is apt to produce some undesirable side effects. Second, physical punishment may be very necessary on occasion and particularly important to use during the formative stages of the behavior during childhood. For example, physical punishment in the form of three or four sharp whacks on the buttocks is often very effective in teaching an impulsive child to stay out of a busy street. Third, when corporal punishment is to be used, all policies regarding its use should be thoroughly reviewed. If the principal is to mete out the punishment, this should be prearranged.

Once a list of negative alternatives has been developed, it is most important to commit them to memory for ready use. It has been a consistent finding of the author that few teachers really know what their negative alternatives are. It appears that they enter their classroom each day with some vague idea of how to deal with student infractions but with nothing clear enough to make them comfortable in doing so. Apparently, many teachers are not aware that many principals evaluate them positively if they are able to handle their own discipline and negatively if they foster a dependency on the principal.

Step Seven: Use Positive Alternatives with Students Who Meet One of Your Major Needs

This step is where everything starts coming together. You have armed yourself with a list of positive alternatives that you have committed to memory in order to immediately dispense them as your needs are met. Your needs have also been listed and you have reviewed them to such an extent that you are always alert to a student who either meets one of your needs or is moving toward meeting one of your needs. As this student behavior occurs, you simply use a positive alternative so that the law of effect will be operating on your side. That is, when a student receives a reward for engaging in a certain positive behavior, the chances are excellent that s/he will repeat that behavior in the future. The important thing for teachers to remember in carrying out Step Seven is to be alert to student behaviors that meet or partially meet one of their needs.

Step Eight: Ignore Behaviors That Violate One of Your Needs by Finding and Praising a Behavior That Does

One of the most difficult lessons for a teacher to learn is to ignore certain behavior. In the face of an infraction there is a great tendency on the part of the teacher to respond with some type of punishment. This is quite understandable--particularly when the usual finding is that a nominal amount of punishment for an infraction works. A problem can occur, however, when the punishment becomes an attention giving payoff by the teacher. To prevent this from happening, the safest practice for the teacher is to ignore the incorrect behavior (at least indirectly) by focusing on some correct behavior by another student and praising it. Most of the time this procedure will take care of the problem at hand. The teacher need not worry about the problem or about losing control of the class through the practice of ignoring infractions. There will be ample opportunity to impress all members of the class with the teacher's authority through the judicious use of negative alternatives previously discussed.

Step Nine: Avoid Traps, Power Struggles, and Student Games

It is very important for the teacher to be alert to behavior management traps. A behavior management trap occurs when a particular type of correction by the teacher seems to work initially but in reality is reinforcing the incorrect behavior of the child. One can see the trap work when a teacher tells a student to leave the teacher's desk and return to the assigned classroom seat. The student does return to the seat, reinforcing the teacher's selective style of correction. Each time the student appears at the desk, the teacher directs him/her to his/her assigned seat. The essence of the trap is that the teacher's corrective action is reinforced by the student's returning to his/her assigned seat, but the teacher is also increasing the student's appearance at his/her desk by reinforcing it through the attention! Becker et al. (1971) state that the parent or teacher is often a part of a conduct problem because of reinforcement through attention. Teachers have to be very alert to avoid traps brought about by giving attention to incorrect behavior on the part of students.

The teacher should also avoid power struggles. Many children involve parents and teachers in a struggle over power by determining to make the parent or teacher yield to his/her point of view or way of doing something. When the child attempts a power play, it is important that parents or teachers avoid the struggle by suppressing their own ego needs through focusing on the corrective needs of the child. Dreikurs (1971) stresses the importance of avoiding a fight by trying to find a new basis for agreement. The worse thing about getting involved in a power struggle with a child is that once it begins in a relationship, it often crystallizes into argumentative/competitive roles that are difficult to eliminate.

Teachers and parents must also be aware of game playing on the part of children. Ernst (1972) states that students play many types of games to get psychological needs met. Even though the psychological need of the student might occasionally be perverted or gross, it will be effective unless the teacher knows how to recognize the nature of the game and respond correctly to it. The most important step for the teacher to take when game playing is recognized is to identify the source of reinforcement and eliminate it, thereby preventing a payoff to the student.

This concludes my description of specific steps to be observed in preventing classroom behavior problems. Most classroom problems can be prevented, and teachers can be a part of a behavioral problem if certain principles and procedures are not observed, e.g., reinforcement of correct behavior through withholding attention. While mastery of the material contained in this section is not required to succeed with principles and procedures for behavior modification contained in the next section, the material is related in that it provides for the prevention of problems. Obviously, it is much more sensible to prevent problems than to develop a modification program to change undesirable student behavior.

Some Perspectives on Behavior Modification

Before studying the specific steps required for carrying out a behavior modification program, it is important to define what behavior modification is and is not.

1. Behavior modification is a process of analysis for changing behavior that usually requires a baselining effort as opposed to a process for teaching behavior that requires an analysis of task or learning requirements. (This latter process will be discussed in the next section.)

2. Behavior modification has been practiced a long time. Our parents used punishers, rewards, and other principles of behavior modification to teach us to walk, talk, and behave in a civilized manner. Consider, for example, how much parental rewarding goes into getting a child to take its first steps.

Industry and business have used punishers, rewards, and other principles of behavior modification for many decades to maintain and even increase production. One common way to increase production is to observe a worker over a time period and to determine how many units of work can be produced per hour. The worker is then offered a bonus for units produced above the base rate originally calculated. Business and industry have also used a reward system, such as an annual Christmas bonus, to enhance positive feelings and thereby to increase work production.

3. The use of a behavior modification program is not a panacea, nor does it always effect a cure. While many times it does effect a cure or an alleviation of the problem, it should be viewed primarily as a process of analyzing and controlling antecedents and consequences of behavior that will yield a high potential for solving the problem presented. Every problem has antecedents and consequences, and an analysis of them must be made if the crucial behavioral elements operating are to be brought under control.

4. A behavior modification program should not be used unless other simpler alternatives fail, such as the following:

   Solving the problem by open communication and feedback.
   Handling the problem through the use of reminders.
   Handling the problem through ignoring or modeling.
   Handling the problem through the use of reward incentive.
   Handling the problem through punishers.
   Tolerating the problem, i.e., determine if it is easier/better to tolerate the problem than attempt to moderate it through the use of a sophisticated behavior modification program.

5. Behavior modification should not be administered in a mechanical fashion, completely divorced from what Carl Rogers (1971) calls "unconditional positive regard."

6. The results desired from a behavior modification program should be fair and valid to all concerned. The program should be communicated in an ethical, open, and trusting manner.

7. Some people are not capable of carrying out a formal behavior modification program. Abidin (1971) points out that it takes a compulsive type personality to observe behavior and baseline it in the consistent, methodical fashion that charts and graphs require. Then, too, it appears that some teachers and parents have had so much success through nondirective, transactional analysis, reality therapy, and other techniques of counseling that behavior modification techniques simply do not appear to them to have that much value.

8. The concepts and principles that undergird behavior modification can constitute real power for the teacher if correctly used. Even if a teacher does not choose to master the techniques of a formal behavior modification program, s/he should be knowledgeable about the concepts and principles and how to use them effectively in the classroom.

Table 8 indicates the wide range of behaviors reflected in behavioral journals that have been successfully changed through behavior modification programs. The specific steps usually followed in carrying out a behavior modification program are outlined in the next section.

The Basic Steps

Step One: Selecting a Behavior to Change

If possible, choose a behavior to change by means of a mutual discussion with the offending student or group. Two things to keep in mind: (1) it is difficult to work on more than one behavior at a time, and (2) the behavior that is chosen should be one that meets a psychological need of the teacher. In other words, it is a behavior that, if corrected, would enhance the teacher's feelings of success and well being.

If the student's handicap is such that a mutual discussion is not possible, the teacher should at least try to give the offending child a clear sense of direction in terms of what the teacher wants in the way of desired behavior. Further, there should be a clear sense of direction in terms of how the behavior is to be corrected and brought under the control of the offending student or group. If a discussion is possible, it should include an agreement concerning an appropriate reward when the offending student or group is making progress toward, or is engaging in, the correct behavior. This is crucial in that it affects the internal motivation of the offending student or group to want to change the offensive behavior. In discussing possible rewards, many teachers have found it helpful to show a list of possibilities and to encourage the offending student or group to select one that is worth more to them than engaging in the offending behavior.

There should also be a discussion of punishment. It happens occasionally that a student or group cannot keep on course without the occasional use of punishment. The nature of the punishment and the time of its applicability should be thoroughly discussed or communicated as clearly as possible. Some teachers have found it very effective to present the offending student or group with a list of punishers and allow one to be selected. One will recall from earlier reading that a thorough discussion of punishment meets

Table 8

Examples of Behaviors That Are Changed

I. ANTI-SOCIAL (behavior that is harmful or hostile to self or others)

- Bites
- Curses
- Hits, shoves, kicks
- Teases
- Throws objects
- Insolent
- Naughty finger
- Calls names
- Bullies
- Destroys property
- Hurts animals
- Drives recklessly

II. INAPPROPRIATE (behavior that is not harmful but yet is unacceptable to others)

- Absenteeism
- Attention demanding
- Bangs head
- Complains, cries
- Feminine (boy)
- Finger sucking
- Homosexuality
- Interrupts
- Lies
- Masculine (girl)
- Noises (makes)
- Phobia (school)
- Plays (with objects)
- Sleeps
- Tardy
- Tattles
- Over eats
- Wanders
- Over drinks
- Passing notes
- Desk carving
- Restroom wall writing
- Corrects (parent or teacher)
- Nail biting
- Sloven
- Importuning

III. INADEQUATE ACADEMIC (directly related to success with school)

- Dawdles, daydreams
- Off task
- No homework
- Incomplete work
- Copies
- Cheats
- Out of seat
- Doesn't follow directions
- Doesn't attend to speaker
- Doesn't respond to teacher
- Unprepared
- Doesn't participate

IV. INADEQUATE SOCIAL (behavior that relates to inadequate social or emotional development)

- Encopresis
- Enuresis
- Mutism (voluntary)
- Passive, lazy
- Withdrawn
- Malingers
- Masturbates
- Pouts
- Stutters
- Tantrums
- Tics
- Shy

one of the major principles of punishment, i.e., one must be warned in advance and must be aware of positive alternatives before punishment can be maximally effective.

Step Two: Obtain Some Perspective on Observing and Analyzing Behavior

It is assumed that the reader has concluded that a problem exists that has to be modified by the use of a formal modification program. That is, it is a problem that cannot be handled by the simplified approaches indicated earlier. Any problem so identified becomes what is known as the "target behavior." After a target behavior has been selected, a decision must be made to decide how to observe it, i.e., is it a type of behavior that is counted or is it episodic with a time measurement requirement. A frequency chart is used to count behaviors such as incomplete assignments, no assignments, out of seat, hitting, talking out, cursing, psychological tics, and body gestures. A duration chart (see Table 9) is used to record behavior that is usually measured by length of occurrence. Examples of behaviors that people tend to engage in for lengthy time periods are thumb-sucking, dawdling, and talking with others.

If the target behavior under observation is to be counted, a frequency chart is selected and the following detailed steps are required:

1. List name of child and the target behavior. The target behavior should be stated as behaviorally as possible. For example, "During the school day Charles speaks without permission or raising his hand."

2. The day of the first observation is listed under Date and next to column number one.

3. The activity occurring at the time of the first observation is recorded under the Activity column and next to column number one. The purpose of recording the activity occuring is to assist in the analysis effort. Many times the target behavior is influenced by the type of activity going on.

4. The starting time for the observation is recorded under the Go column.

5. The stop time, that is, the time when the observation ended, is listed under the Stop column.

6. The number of times the particular behavior under observation occurred is recorded under the Frequency column.

Table 9

Duration Chart
(How Long is Each Episode?)

Name____

Target Behavior________________________________

	Date	Activity	Go	Stop	Length of Behavior	Antecedents - Consequences
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						

7. The rate of occurrence of the behavior is arrived at by dividing the number of occurrences of the behavior by the total time of the observation and this value is placed under the Rate M/M column.

8. Under the last column (Antecedents - Consequences) record anything you feel might have influenced the child's behavior at the time of the observation. It is particularly important to record anything that happens just before the target behavior that seemingly or possibly influences (causes) it. It is equally important to record anything that happens just after the target behavior that seemingly or possibly influences (sustains or rewards) it. Recording events that occur before and after the target behavior that seem to be related to it is a crucial part of the analysis effort that supports a successful behavior modification program.

9. Transfer the rate value found in the Rate column to the Behavioral Analysis Chart and record it in the appropriate column there.

Graphed behavior is analyzed at three distinct time periods. The first analysis is done after the initial observation period, which consists of usually a week or two of observations. The second analysis of graphed behavior is done during the operation of the modification program in order to determine whether the modification program is succeeding and, if so, to what degree it is succeeding. This analysis is done to determine what the long-term effects, if any, of the modification program have been. The post-program analysis also helps determine whether a new modification effort needs to be made.

Step Three: Observe and Record the Behavior

Important questions to be answered here are: (1) At what time of the day will the behavior be observed, i.e., will it be observed as it occurs throughout the day? Will it be observed only during those times when it is most likely to happen? Will it be observed once an hour--or once in the morning and once in the afternoon? (2) Who will do the observing, i.e., will it be the teacher? Will it be an aide? Will it be an outside observer? Will it be the student? (3) How will the behavior be recorded, i.e., will it be recorded directly on an observation form? Will it be recorded by a wrist counter? Will it be recorded by a timer? (4) At what point in time will the observations be totaled and recorded on the behavior analysis chart, i.e., at the end of each day? At the end of each week? At the end of each class? How will the behaviors be counted?

Several ways of counting behavior are described as follows:

(1) The observer might put an appropriate number of chips in one pocket and as the behavior occurs transfer a chip to the other pocket. In this procedure, the observer at the end of the day merely counts the number of chips that have been transferred. This figure is then recorded on the frequency chart previously discussed.

(2) Another way to count behavior is to place a wide band of masking tape on the wrist and mark each occurrence of the behavior under observation on the tape. At the end of each day, the number of marks is tallied and the data are transferred to the frequency chart.

(3) Some observers prefer to use a golf wrist counter. A golf wrist counter is inexpensive but is a rather sophisticated way of keeping up with the behavior under observation. The author has found this to be the easiest way and perhaps surest way to measure the frequency of a behavior. Of course, the values obtained with the golf wrist counter are recorded the same way as previously discussed.

(4) Some observers prefer to use a tally register (No. 2). This is another sophisticated but inexpensive way to measure behavior. The chief drawback to its use is that it makes a clicking noise which can be distracting to everyone around. The results from this type of counting are recorded on the frequency chart the same way as previously discussed. It must be impressed on the reader that observing and graphing behavior provides four major benefits, as indicated in Table 10.

Table 10 indicates the importance of recording behavioral data. There is a tendency on the part of many to bypass behavior graphing after a decision has been made to use a modification program. This is illogical in that one will recall from earlier reading that a formal modification program is not to be used unless simpler approaches have been tried and have failed. By electing to use a formal modification program, one is recognizing the need for the systematic and sophisticated problem-solving approach that behavior graphing represents. Hence, it makes no sense to bypass the very heart of the formal modification problem that has already failed. As indicated in Table 10, behavior that has been graphed provides a ready analysis in terms of how often it occurs or how long it occurs and under what kinds of conditions it occurs. The graph data further provide feedback to the child whose behavior is under observation. Dreikurs (1971) and Hilts (1974) emphasized the importance of feedback to a person in order for that person to be properly motivated not only to correct the behavior but also to control it in the future.

Table 10

Purposes of Recording Behavioral Data

1. It is the heart of the analysis effort:
    a. how often (frequency) or how long (duration)
    b. under what antecedent and consequent conditions
2. It provides feedback data to child involved.
3. It provides a basis for evaluating the remediation effort.
4. It can provide a source of encouragement to the teacher, parent, and others working with the remedial program.

Step Four: Select An Appropriate Reward

One will recall from earlier reading that the selection of an appropriate reward is crucial to the success of the modification program. If the reward selected is not considered to be more valuable to the offending student or group than the offensive behavior, it is probable that the modification program will fail. It is also important to keep in mind when selecting a reward that factors such as satiation and competing rewards might reduce their effectiveness. Satiation occurs when a reinforcer has been used so often that it has lost its value to the receiver. Satiation easily occurs with primary reinforcers such as candy or sweet beverages. An example of a competing reward occurs during holiday or festive occasions. The child in the modification program oftentimes gets so enthused about the upcoming special occasion that the rewards being offered to keep him/her at the task temporarily lose their effectiveness. In those instances where satiation occurs, it is a simple matter to change to another reward through the discussion route previously mentioned. In those instances where a competing reward has appeared on the scene a decision must be made whether to go to a more powerful reward in an attempt to overcome the competing stimuli or to temporarily discontinue the modification.

Many teachers feel constricted when considering the possible reward options available to them. All too often they feel they must limit their rewards according to what is available in their classroom. One way to find an effective reinforcer in the classroom is to observe the child's behavior when s/he is supposed to be doing something else. This self-selected behavior on the part of the child can often be turned into a most effective reinforcer. For example, one teacher observed that one of her students frequently walked around the room during seat assignments. She allowed the student five minutes of walking around time for an increasing amount of seat work. This clever teacher knew how to implement the Premack principle. That is, she paired a high frequency behavior (walking around) with a low frequency behavior (seat work) and made the walking around contingent on a certain increase of seat work. This teacher's approach also illustrates the simple concept of "Grandma's rule" which is, you do what I want you to do before you do what you want to do. Table 11 shows ways that teachers can increase reward options beyond the confines of a particular classroom.

Table 11 indicates ways that the administration, an employer, and the parents can assist the teacher in effecting desirable behavior changes by providing powerful reinforcers. The list is not intended to be exhaustive, but rather suggest the concept that numerous payoffs are possible with a cooperative arrangement. One can readily see which payoffs are appropriate for older students as opposed to elementary-age children.

Table 11

Ways to Increase Reward Options

Administration

Privileges

1. Work in office rather than go to study hall
2. Bring automobile to school

Activities

1. Field trips
2. Style shows
3. Establish recreation - hobby centers

Status

1. No ticket needed for class admission or walking in hall between classes
2. Outstanding student
3. Honor roll
4. Return to mainstream

Employers/Employment

Privileges

1. Grant a job
2. Grant overtime
3. Grant time off
4. Grant raise in pay

Parents

Activities

1. Dating/going out
2. Phone
3. TV
4. Stereo
5. Parties
6. Hobbies

Privileges/Status

1. Car
2. Clothes
3. Money
4. Ice cream
5. Beverages
6. Candy

It is very important for the teacher to remain in close communication with the offending student or group regarding the effect of the reward. Usually all this involves is simple observation on the part of the teacher. If the offending student or group is extremely young or language handicapped, the teacher must exercise great care to maintain the effectiveness of the reward. Again, it is important to remember that, when possible, any change in reward is made with the consent of the offending party.

Step Five: Prepare For Negative Contingencies

It is important to remember that any student or group that is subject to a behavior modification program is capable of much negative behavior. Hence, it is most important that the teacher have negative alternatives, as previously discussed in Section Four, firmly fixed in mind. When using a negative alternative, the teacher should respect the principles of punishment as previously discussed in Section Four and should keep the offending party informed in an open and honest manner as previously discussed.

Many teachers feel powerless and weak when considering the number of punishers that are available to them. This feeling of powerlessness probably stems from the idea that the only punishers available are those that are readily available in the classroom. Table 12 shows punishers available to the teacher beyond those normally available in the classroom. To use these punishers, it is first necessary to effect a cooperative agreement with the other parties involved.

The list of punishers described in Table 12 is not exhaustive, but it rather suggests the idea that numerous powerful punishers are available to the teacher through a cooperative arrangement with other interested parties. Again, one can readily see that some punishers are only appropriate for older students.

Step Six: Begin the Program

Actually this is the second phase of the program. The first phase was represented by the observing, recording, and analyzing of the target behavior. This second phase represents the initiation of the treatment of the problem. This is a critical operation in that the teacher must strive to observe all instances of correct behavior so that it can be rewarded. It is extremely important that young handicapped children be rewarded each time the correct behavior is engaged in. This continuous reinforcement of correct behavior is important to get it going. Also, continuous reinforcement builds a positive credibility image for the teacher. (Remember, many students will have received quite a bit of abuse and inconsistent treatment from teachers and administrators prior to the inception of the formal behavior modification program.) It is also very

Table 12

Ways to Increase Punishment Options

Administrators	Employers/Employment	Parents
Suspension	Temporary job suspension	Loss of privileges
Detention	Loss of overtime	Car
Isolation	Assignment to menial or less attractive jobs	Dating
No extra curricular activities	Loss of on-job-training status	Going out
		Phone
		TV
		Stereo
		Parties
		Hobbies
		No ice cream
		No soft drinks
		No candy

important to give the reinforcement as close as possible to the actual time the desired behavior is engaged in. It is equally important to ignore as much of the incorrect behavior as possible to facilitate its extinguishment. It is also very important to remember to pair a social reinforcer with the reward that is given. The pairing of a social reinforcer with the reward will hopefully lead to the eventual desired end of the social reinforcer maintaining the behavior without any other reward needed. This realization will, of course, make the teacher's long-range reinforcement program much easier to carry out.

Step Seven: Change the Reinforcement Schedule

It is very important to change the reinforcement schedule at some point from continuous to intermittent. This should be attempted after the desired behavior has been established fairly well. This is to maintain the student's good behavior. Research indicates that continuous reinforcement is necessary to initiate good behavior, but intermittent reinforcement keeps the behavior going. It seems that a continous reinforcement schedule eventually fosters a dependency that does not lead to the desired end of internal self-control and motivation. An intermittent schedule of reinforcement is also much easier for the teacher to manage in that it is less demanding and time consuming.

Step Eight: Terminate the Formal Reward Program

When the offending behavior has been modified to a point of acceptance or toleration, it is important to discontinue all formal reward efforts. It is equally important, however, for the teacher to continue intermittent social reinforcement in the form of praise, smiles, and hugs.

Step Nine: Do a Post-Program Analysis

This step represents phase three of the formal behavior modification program. It is carried out a month or two after the behavior modification has been terminated. It consists of 10 or more observations over a week to two-week period to determine the probable long-term effect of the modification program. It is agreed that this step is time consuming and on the surface might appear unnecessary. If it is respected, however, it oftentimes reveals very important information concerning ways that future modification programs can be improved. Also, this analysis can indicate whether a new modification program should be undertaken for the offending student or group under study.

What to Do If the Program Fails

Many people fail with their initial behavior modification efforts. After a failure, there is a great tendency to give up and revert back to prior efforts rather than attempt to analyze what went wrong. Almost invariably a key principle or procedure has been omitted or violated in most failure cases.

When the program appears to have failed, review these concepts and procedures:

1. Was the behavior analyzed correctly in terms of antecedents and consequences? Were all of the behaviors and conditions that preceded the offending behavior accounted for? Were all of those factors that could possibly be construed to serve as a consequence of the offending behavior identified? A thorough analysis of antecedents and consequences is vital in that it is the antecedents that the teacher must control in order to prevent the triggering of the offending behavior, and it is the consequences that keep it going. Hence, it is very important that both be identified and controlled.

2. Was the offending party properly motivated to correct the behavior? This is probably the most common error that is made in carrying out a behavior modification program. All too often the teacher or parent arbitrarily selects a reward that is concluded to be an effective motivator without verifying it with the offending party. Also, was there open, honest communication between the offending party and the corrector? It is extremely motivating when one perceives the corrector to be genuinely interested in helping.

3. Was the program carried out on a consistent basis? Here is another area where many behavior modification programs fail. It is absolutely imperative that the modification program be consistently translated. This is particularly true when one is attempting to modify the behavior of a very young child or a very handicapped child. The rewards must be given on a basis consistent enough for an association to be formed between the desired behavior and the reward.

4. Was the modification program carried out for a sufficient time period to succeed? Many tough problems take time to correct. This is particularly true for the correction of bad habits. If it has taken months or years for a problem to develop, it stands to reason that some time will often be required to get it under the control of the individual. One baffling phenomenon described numerous times in the literature is a sudden increase in the incorrect behavior after a corrective program was implemented. The increase in the incorrect behavior was usually followed with a slow but gradual decline. One not familiar with this phenomenon could easily construe the increase in incorrect behavior to mean that the program not only failed but aggravated the problem!

Using Tokens In a Modification Program

Tokens are used when a more powerful reinforcer is needed; that is, previous reinforcers such as praise, privileges, and activities have proven ineffective. Tokens are to be avoided if at all possible. As most of you know, tokens are difficult to use and in fact usually require the assistance of an aide if they are to be used successfully in a classroom setting. Table 13 is presented to assist in learning about the use of tokens.

Stainback et al. (1973) suggest several basic steps to observe in carrying out a token economy in a classroom setting. Perhaps the most basic step is one of securing an aide or volunteer. Because a token economy is time consuming and rather exacting in the initial stages, it is important that more than one person be available to dispense tokens, provide payoffs, and keep account of points earned. The aide or volunteer should not be related to any member of the class and should be thoroughly trained in principles of behavior management. The assistant must understand the proper role to play while helping the teacher in carrying out the token economy. For example, there should never be any conflict between the teacher and the assistant in terms of whether a child should receive a token or whether a child should receive a payoff.

Another important step in carrying out a token economy is the one of arranging the classroom for its proper implementation. It is very important that the furniture be arranged so that the tokens can be dispensed with a minimum of disturbance, and the teacher must plan assignments so that the behavior of the group can be observed at all times.

Another basic step involves the selection of a token that is not easy for the student to duplicate but is small enough to dispense easily and at the same time attractive enough to have some appearance value. One creative teacher allowed a group to design a token dollar. The dollar that the group designed was about the size of U.S. currency but had Wampum printed on each side with the head of an Indian printed in the middle. This "Wampum" proved to be a highly effective token for the group.

Another basic step in carrying out a token economy is arranging for the payoff. This involves answering several questions. How many points/tokens are to be earned before something of value can be purchased? What kinds of items will be made available to the students for purchase? Can some items be purchased through the parents and the home? Can items be purchased at the end of the day? At the end of the week? Or can items be purchased at any time?

Table 13

Examples of Primary and Secondary Tokens That Might Motivate Students to Meet Psychological Needs of Teachers in Classroom

SECONDARY		PRIMARY
1-10 Points or 1-10 Ticket Punches	Payoff	Lunch or Recess or Candy or Gum
		or
10-20 Teacher Initials or Stars 1-10 Tokens	Payoff	Good Friday Letter with Possible Home Reward of Money Ice Cream Phone Privileges Dating Privileges Family Auto Special Trip Special Privileges
		or
		Special Class Privileges such as no work assignments or day off
		or
		Special Activities of Student's Choosing
		or
		Special Activities Sponsored by the school

Another basic step involves the question of how the student will handle tokens that are earned during the day. One teacher solved this problem by asking each student to bring a sock to class. The students put their tokens in the sock as they were earned and in this particular class had to ante-up five tokens to go to the playground and an additional 10 tokens to go to lunch. The author understood the value that these students placed on their tokens!

Before undertaking a token economy, the teacher should review all steps normally observed in a behavior modification program so that the token economy program will be complementary to the behavior goals established for the offending party. A good example is the pairing of the token with a social reinforcer (Becker et al., 1971). Pairing is crucial if the teacher is to move away from the use of tokens to a simpler reward system provided by social reinforcers. In pairing a social reinforcer with a token, what one is doing is ultimately giving the social reinforcer the power of the token through respondent conditioning that Pavlov has described so well in his work with the dog, bell, and meat powder. The reader will recall that the bell took on the reinforcing properties of the meat powder after having been repeatedly paired with it. Hence, tokens should be gradually phased out in favor of social reinforcers as respondent contioning takes effect.

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BEHAVIOR ANALYSIS

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There is a law of which I am very fond called the law of requisite variety, which says that in any system of two or more elements the element with the most choices will always win. One of the problems for people who work with severely/profoundly handicapped kids is that the kids have more choices than you do. You will lose. I was talking with a teacher who said that she did not know what to do. This child urinated on her rubber tree plant, then started eating the leaves, turned it over, banged it on the wall, and threw a temper tantrum. Look at the choices that child had. One of the things training will do if you are not careful is to limit your choices. I would like to encourage you to think about how you can increase your choices.

Behavior is preceded by a set of environmental stimuli and environmental events, things that trigger or cue behavior. Everything I have done in the way of behavior is triggered and cued by an environmental event. I am pacing where I am pacing because there is nothing in my way. This is an antecedent to my behavior because I deduced that I probably will not run into anything if I pace here. If I write something down, I will probably write it in that gray and white area. That board is an antecedent to my writing. A green light is an antecedent, a red light is an antecedent. You are hungry. That is an antecedent.

One way of dealing with people is to structure antecedents which help bring about a desired behavior. One powerful ingredient with the population you deal with is curriculum. It is critical to individualize it so you can see where the child can start functioning. For example, a child in Minnesota kept running away. The principal of the building did not want to use a silver lock, which was the antecedent type of thing to do to stop him from running away. So the first thing the teacher did was to move him across the room. The second thing she did was to take off his shoes and socks, which slowed him right down because you don't run too far in the snow without shoes and socks. I thought that was rather interesting. There are a lot of ways to use antecedents.

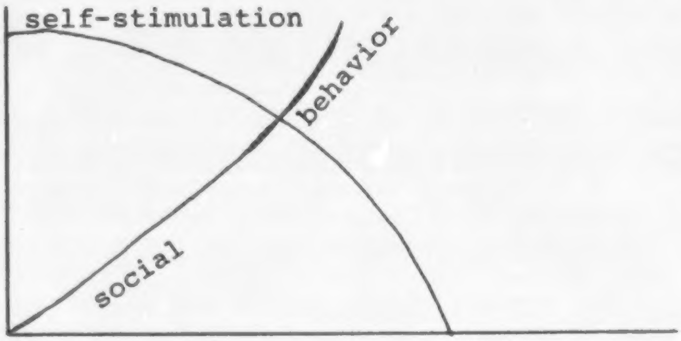
Consequences are things that follow behavior, whether behavior will continue, stop, increase, decrease, stay the same. The whole area of behavior management is one in which lots has been written. The teachers do not get a lot of support with it. The skill is like any other skill: you cannot learn it on the basis of a workshop. This training is to give you some ideas to get you started.

Self-Stimulation

It has been found through research that if you leave normal children alone, they start self-stimulating. Normal children do not stimulate in some of the same ways severely/profoundly handicapped children do, but we all self-stimulate. It is a fairly normal human behavior. One example is nose picking. Praying is self-stimulating. College and university professors take your money so they can self-stimulate. They are often into teaching so they can be self-stimulated. There is a lot of evidence that gurus use self-stimulation in several ways which literally block out awareness of other things like pain. What is the problem of self-stimulation? Again, this is something there is very little question about; it prevents further development.

It is important in working with severely/profoundly handicapped children to start with their strengths, their islands of adequacy. If they have some strengths--motor ability, behavior, ability to do certain tasks, to interact with other people--find them. The prognosis is better. Behavior really is maintained by reinforcers. Autistic children very frequently have an island of adequacy in relation to an ability to do some little thing like math. You have to be imaginative. Find their strengths or primary reinforcers. One thing will not work with every child. You have to play around with it. What is the primary reinforcer?

A study done by Lovaas, who does a lot of work with children who are labeled autistic shows that kids who self-stimulate a lot have social behavior as a very low priority. When you start teaching children social behaviors, self-stimulation drops off. There are many variations of the theme, but one primary way to reduce self-stimulation is to teach something else. Obviously if children are self-stimulating it is difficult to teach them something else, but it can be done, and I will give you some ways to do that.



What is the primary reinforcer for self-stimulation? There is an increasing amount of research on this topic in the last two years. Self-stimulation is food for the nervous system. In fact, we become deprived if we do not get enough stimulation. People self-stimulate because for some unknown reason they are not receiving enough stimulation. Why is this important to know? Because there is a tendency to regard self-stimulation as garbage behavior. It actually serves a very useful function.

I received a handout the other day called Behavior Management for the Deaf-Blind. One thing it states is to be careful in reducing self-stimulation because it is important for these kids. It is providing them a kind of way of feeding stimulus hunger. If you want to know what stimulus hunger is, simply reduce every bit of sensory input you can. There have been studies on this too; lay on a water bed, use earplugs or earphones so you cannot hear anything, cover your eyes where you totally cannot see any light. You start going crazy. Stimulation is a necessary part of staying alive. If the nervous system does not get stimulation, it atrophies. It cannot be regenerated. These kids are self-stimulating for survival, not to drive you crazy. They need it physiologically to stay alive. This may help you in dealing with them to be able to see them as human beings who are doing something to try to help themselves.

In studies done with Rhesus monkeys, the monkeys were raised in total darkness until they reached puberty. Then they were brought out into the light to see what effect it had. The effect was that the monkeys never were able to see because the nerves controlling the eyes atrophied from being raised in the darkness.

Rinkover studied self-stimulation. Rinkover selected children who self-stimulated on objects, took the objects away, and used them as reinforcers to teach regular school subjects. The kids worked like crazy. There are creative ways to break through barriers in order to teach. One way is to use objects of self-stimulation as reinforcers, but if you are not careful, the child can statiate. One child liked a song, but the same song day after day becomes weak as a reinforcer. Somebody suggested trying bluegrass music because there are 100,000 songs of bluegrass music and it is all kind of the same but it is all kind of different. So they tried it and they never ran out of reinforcers for this child. With some children other things are more powerful. Just a few seconds of music or lights. Some teachers have successfully used recess as a reinforcer. I am talking about sensory or perceptual reinforcers. We all like them. When children self-stimulate, since it is obviously reinforcing to them in terms of their sensory/perceptual reaction, it makes sense to use that as a reinforcer.

A very famous artist named Van Gogh was color blind. He did not listen to people who told him he needed a little more blue, a little more yellow, a little more red. There are certain behaviors that provide us feedback in which the feedback itself is fun. Van Gogh knew when he had the color he wanted. He could not see what color it was, what it was on the canvas, but he learned based on sensory feedback. Basketball is another example. Basketball players know when to release that ball. They know how much pressure. It is just there. The feedback is very satisfying. The reinforcer is feedback. We do it with music, with pinball machines, with puzzles, knowing this is right. A lot of sensory/perceptual feedback is very reinforcing.

I want to point out again that it is important to stop self-stimulation behavior, but you must provide another stimulation. If you do not stop self-stimulation behavior, you are not going to teach.

Some studies have been done on children who have more than one way of self-stimulation. They found that if you suppress one, the self-stimulation increases in the other areas. There really is a physiological need for this. I would like to suggest that with some children you never can get rid of it. What is your choice? Teach them more appropriate ways. We started out sucking our thumbs; that is self-stimulation. But we learned other ways to do it; we learned to do it when people are not watching. One of the things you can do with children who self-stimulate is try to move them in a direction where it becomes more socially acceptable, so they are not self-stimulating in ways that make people want to stay distant and regard them as strange creatures. If you do not put in more socially acceptable forms of behavior, they will use the more unacceptable forms of behavior. I suggest that programming in behaviors that tend to be reinforcing in themselves, like play, is important.

It is important to see these children as normal. It is not that they are so abnormal, they simply have not learned enough yet. Some day it may be possible to have programs for children who are severely/profoundly mentally retarded, autistic-like, etc., in which they learn at approximately the same rate as most children learn in schools today. The reason why they are not learning now is that we do not know enough about how to teach them. We must find a way to deal with their special way of learning. Look at the antecedents, look at the environment. Learn to deal with what is getting through and what is not. The problem is that it is slow and there is not much feedback for you. You will have to reinforce yourself massively. Most persons who work with severely/profoundly handicapped will not be able to continue unless they get reinforcement for themselves.

Aversives

Some children's ranges of antecedents are so limited that the trainer must use aversives. Society's reaction to this is often hostile, and I think if I were working with this population, I would have some concern about what I did in terms of aversive procedure. You must take care of yourself. Be sure you talk to a lawyer and to a child's parents about the procedures you use. However, it is sometimes easier to get forgiven than to get permission. You must be the judge. People must understand that you are trying to help kids get free, not to control them. There are some things that you can reinforce and reinforce, and the child just sits there. That simply means that the reinforcer is not a reinforcer.

At Parson's there was a child who was a head banger. They had to restrain him. They had tried everything. The only thing that would work was a belt shock. Shock really works with self-mutilation. The belt is as aversive as putting your finger in a wall socket. Parsons worked out a deal where the person delivering the shock got the same shock. Why does this shock work? Why does it stop self-mutilation? The child cannot control it. The reinforcer for self-stimulation is sensory in nature. The reinforcer for self-mutilation is social. Self-mutilation will decrease like crazy if left alone, but you cannot afford to put these kids in isolation because they will kill themselves. That means that you have got to use aversives.

One problem with behavior management is that it is very slow. There is so little feedback with the severely/profoundly handicapped. You need to understand that it is not you. You are dealing with a population where a lot of rapid moves forward are not always possible. In fact, almost never.

The second problem with behavior management is that it can be very reversible. Change the environment, and behavior reverts. That is why the maintenance of a therapeutic environment is necessary, but it is also a huge problem. You must involve parents to help maintain the gains. The children go home for a summer, they go home in the evening, or they go home for a weekend and the behavior reverts. For some kids, the environment may have to be maintained all their lives. Parent training programs are critical with this population.

Another problem with behavior management is that is it very situation specific. I once saw a film about a boy who bit himself. They tried a lot of things. It took almost 3,500 trials before it finally started dropping off. They moved him out, put him in another room, and the biting went right back up. When it is that situation specific, in certain kinds of post-treatment environments, that is a real problem in generalization.

The last problem with behavior management is that it does not work unless you intervene massively. One hour a week will not do it; 10 hours a week will not do it. That is another reason that parental involvement is essential. Leon Eisenberger wrote an article on The Effects of Institutionalization. Kids adapt to being in institutions; sometimes they do not even want to leave. But what happens is that individual differences become washed out. They become institutionalized. It can be as big a problem as whatever got them in there in the first place. They are much better off in some kind of family home or foster parent arrangement, any kind of community-based program. Institutionalization should always be the last alternative.

Things to consider about using aversives:

1. You must build in other behaviors. A child needs some way of learning and gaining control over his/her environment other than your punishing him or her. If you punish a child, you become responsible for him or her because you become the source of his/her control. It is immoral, illegal, and unethical not to build an alternate behavior. Try everything else first, even faith healers.

2. Let the parents know exactly what you want to do and why. Get a letter of release from them. Do not use aversives without parental permission.

3. Get medical people involved; let them know what you are doing.

4. Get data in relation to the deviant behavior. This is critical. Know where it occurs, when it occurs, what the child does, and numbers of times.

5. Get some colleagues to witness what you are doing.

6. Get a lawyer, so you do not have problems with suits.

7. Have some friends around you because you are going to get depressed. So get some support.

There is a rule I called the 80-20 rule. It applies to every human being. You need about 80% positive strokes to 20% negative strokes or you will become depressed. It is true of people you work with, your clients, your patients. Do not start using aversives with a new child right away. Try to wait 2 to 3 weeks and use a lot of positive reinforcement first. The more reinforcing you are to a child, the better punisher you will be.

There are two ways to stop or slow down behavior. One is to eliminate the causes of behavior; that is called dealing with antecedents. The causes of undesirable behavior can be external or internal. The external ones have to do with giving them tasks that are too difficult, interrupting them while they are in an activity, environmental things like excessive heat. A lot of these external causes of undesirable behavior are things that you can attack. Lack of visual, auditory, tactile, or physical stimulation causes behavior problems. Get the kids moving, get them up and hopping around. Internal causes have to do with deprivation states. People need attention and that is a deprivation state if you do not get it. Curiosity is a deprivation state, physical activity is a deprivation state, sex is a deprivation state. One of the most frequently asked questions is about masturbation. Well, my basic suggestion is to find a place for them to do it which is not public. You do not try to eliminate a behavior like that. You cannot do it. So in terms of working with antecedents, you can provide a daily routine that eliminates some external and internal causes of negative behavior. Above all, remember the 80-20 rule.

Talking again about aversives, overcorrection is a mild aversive procedure. One form is positive practice and the other is restitution. Positive practice refers to the fact that if the individual does some behavior that you are trying to reduce, the practice will become aversive. The individual is required to practice the appropriate way to do it for a period of time such as 20 or 30 minutes. The practice will become aversive. Positive practice simply means that someone models the correct way to do it and requires the child to practice the modeled behavior. This is usually done in the setting where the inappropriate behavior occurred. Some staff have trouble with this because it is punishing to the staff. Most of the children you work with are not going to hop right up when you say it is time to practice, but you must see that they practice.

The other type of overcorrection is called restitution. It is distinguishable from positive practice, but there is overlap. Restitution means you return the environment to the state in which it was found, and then you overcorrect. For example, if a child always knocks things off the table or turns tables over, s/he practices setting the table, and then s/he practices waxing the table.

When using overcorrecting, you cannot afford to tell the child you are going to start this, and then back off. Neither can you expect that the child will do this willingly. Here the training staff must provide graduated guidance. It is a technique of guiding the individual to perform the desired behavior firmly, assertively, without backing off. There are different levels of helping individuals with instructions. You almost always start with physical guidance: the individual is physically manipulated through part or all of the correction procedure. In physical guidance you do not want to be aggressive, you want to be firm. You obviously cannot afford to do this to somebody who is stronger than you are. You never force, you simply do not let the individual do what s/he wants to do. You hold him or her until s/he is ready to comply, and as s/he begins to perform the movement with your guidance, you start backing off with your guidance. If the desired movement slows down or stops, you move back in, but just enough to get him or her back on track. The idea is not to be agressive or to scare the individual, it is to consistently use a mild form of punishment. So you almost always start with physical guidance.

Some patients can be verbally told what to do and they will do it. In that case you do not have to use physical guidance, you simply give verbal guidance through the overcorrection and let them do it on their own. Someone must always demonstrate what is to be done before you make the patient do it. In most cases they will eventually do it by themselves, so you do not always have to go through the hassle of physical guidance.

People favor overcorrection as an aversive procedure for a lot of reasons: it is reasonable, logical, and mild. Overcorrection is also time consuming, and it takes energy. Staff members can easily grow to hate it, but it is effective over a wide range of behaviors. It has the same problems as other kinds of behavior management. It needs to be done very consistently, it cannot be done haphazardly. It must be done every single time. With overcorrection, as with any kind of punishment, you must also reinforce appropriate behavior.

Overcorrection obviously is not the only type of punishment. Electric shock is very effective with self-mutilation. There are problems with it. It cannot be done in Texas. Extinction is another form of aversion. Extinction simply means you ignore the bad behavior. There are problems with extinction; again, it is slow, and you have to learn to ignore the behavior and that is a learnable skill. Basically, it involves your getting preoccupied with something else either in your mind or in your behavior. You cannot afford to orient in any way, because the child must know that what s/he is doing will not tune you in, in any fashion. We think we are ignoring if we do not say anything, but we may be giving visual or other body cues. Extinction is frustrating because the behavior will get worse first. That is true of most kinds of aversiveness; the behavior will get worse first, but be glad about it--it is working.

Time-out is another aversive procedure which can be very effective. It means removing the child from the room for a few minutes. There are some children who do not have to be removed. You can enforce time-out right in the room where you are by providing a nonexclusionary time-out. You put a ribbon around his or her neck and time him or her right there. Time-out has been used for self-stimulation and a lot of different behavior. You do not ever want to time-out a self-stimulation behavior if the child is providing stimulation with his or her own body because when s/he goes into time-out, she or he will have exactly what s/he wants. Behavior like masturbation is the kind that is not good for time-out procedures. Time-out will work well if the object by which the child is self-stimulating is not available in that time-out room.

Self-Management

I believe that there is an unnecessary stress on teachers. I get distressed by looking at competency-based materials. I know some people who list 26 competencies that a competent teacher would have. This is unrealistic. A lot of persons in this society harbor mythical beliefs that someday we can be perfect, and the trap of perfection stops so many people from trying. The penalty for failure is self-imposed guilt and anxiety, and it limits human beings. You have got to be free to get out from behind the desk, and say "Let's try it. Let's find out." If it does not work too well, adjust it. We all grow by risking. A teacher must have choices. Persons need choices in their personal lives or they will be drained and will not have the energy to deal with the world or to deal with a very difficult job. For that reason, you need to learn self-management first.

Many persons are hired as aides and teachers to work with severely/profoundly handicapped types of individuals on the basis of compassion, a feeling that somehow this individual who is going to work with this child is more compassionate, more caring than other people. What these persons need is a lot of counter-control, a lot of behavior persons can do to take care of themselves--doodling, sleeping, needle point. Populations who do not use counter-controls lose their compassion. Compassion, like any other behavior, must be reinforced to be maintained. We feel compassion for: people who hurt, people we are hoping for or have dreams about. If some of those dreams do not materialize--the people do not change, they are too helpless--then there is no reinforcement for compassion. It shifts from compassion to carelessness, carelessness to callousness. And for those who stay in it long enough, from callousness to cruelty. Eventually it can happen to you. In order to maintain compassion, there has to be a give and take. That is one of the reasons why you need to start building adequate behavior in children, so they have more control. Then everybody wins.

In self-management, we talk about the management of feelings. Feelings determine how you act. Feelings determine if you act. It is incredibly important to mention and it is very misunderstood. There is a myth about feelings--that you can share them. That is a very commonly accepted myth, but you cannot share feelings. You cannot know what it is like to be me. I can tell you about it. I can describe it to you. I can use words, but I can only share my representational system of the world by going through another representational system, called language. I cannot give you the feeling. I do not care how good you are at empathizing. You can only interpret on the basis of your experiences, and it will not be the same as mine. So, if I tell you my father died in December, for those of you who have lost a father, it will trigger a feeling in you. But you cannot know what that means. You cannot know how I felt about that, and I cannot know how you feel.

Many persons think behaviorists are cold, controlling, and mechanistic. The only power a behaviorist has is affect. You cannot separate your affect from your reinforcers. The real power of the reinforcement of saying "that is a really pretty dress" is the way I say it. It is affect.

Another myth is that you cannot control your feelings, that they just happen. The only poster in this building which I really do not like, because it is not true, is one that shows a picture of a faucet with water running out of the faucet, and it says "Feelings are not like faucets--you cannot turn them off and on." But you can and in fact you do. My favorite example is a guy who was doing marriage counseling in people's homes, and in one place the wife was really upset. She was yelling, screaming, and crying, and the phone rang in the living room. She picked it up and answered it just as calmly as anything and said "Hello. Sure we are here. We are fine. Let me call you back." As soon as she hung up, she began again without missing a beat. So people believe that we cannot control our feelings. We say things like "it wasn't my fault," or "I just got carried away." But, in fact, we can control them.

Another myth that we believe is that feelings have a life of their own. We say things like "I lost my temper." We believe the feelings are separate from us and, therefore, there is nothing we can do about them. There is another myth. We tend to believe that other people are responsible for them. "I cannot help it. You make me angry." "You did it. It is not me." You are not responsible for other people's feelings. I suggest you try to be responsive to them, but not responsible for them.

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The whole process of understanding where feelings come from is one that is probably not too complicated, but I think it is very important. We are talking about the management of feelings. They do determine how you act, if you act, and where you act. When you wake up and are really feeling good, and then have a good day, you act one way. If you wake and really feel bad, things are not going well, you act another way. The thing I want to submit to you is not that I want you to erase your feelings. Feelings are important. I am for people having them, but only in the way that will become clear as you go along. Take a look at the way we behave.

We tend to believe that the way we feel depends on the external world and on other people. We believe and have learned that our feelings are the result of the environment in which we find ourselves. That is not true. We have been taught, for example, that if a person does something called an action directed at you and that action is something negative, that you are going to have a reaction and that that reaction is the fault of the person who is acting. After all, you were minding your own business. It is not really that simple. Actually, what happens is that there is in fact an action, but what you do first is that you have a perception, followed by a thought, followed by a feeling, followed by a reaction. That all happens so fast that it is incredible.

If our feelings are not the fault of the environment, what are they the fault of? Self-management basically is learning a skill in order to change that chain reaction of perception, thought, feelings, reaction. The easiest thing to change is your thought and your perception of the world. It is so incredibly important to understand that children often get treated the way they get treated by people who do not even know they are treating them that way, because they are not aware of what their perception is. Some persons doing some research here in Austin found out in certain classes that boys tended to get better grades than girls, but in other classes the girls tended to get better grades. The question was what is happening and why? They found out that in every instance where boys tended to get better grades, the teacher believed that in grade school boys tended just to get better grades based on her past experiences with brothers, etc. In other words, it was not a product of academic ability, it was a product of teacher perception. The teacher did not even know it. So you see that your perception is really critical. But your thoughts are also critical. Your thoughts come from your perception. If you thought that I was going to give you a thousand dollars on your way out here tonight if you stayed till 6:00, I probably could not get you out of here with a crowbar.

Some of the ways we react are much more adaptive than others. As you know, some reactions are very maladaptive, others are very adaptive. Self-management is possible only if one recognizes this. It is possible to learn to use more adaptive reactions and to avoid using maladaptive reactions. I would like to suggest that the main difference between an adaptive reaction and a maladaptive can be summed up in this sentence: No negative feeling can be continued and make us feel miserable unless we overreact. I would like to tell you what happens to you physically when you overreact. First, the brain sends the signal to the hypothalamus, and says something out here is trouble. The hypothalamus releases a hormone called ACTH, which goes to the adrenal gland. When that hormone hits the adrenal gland, adrenaline is fired into your bloodstream, which causes an explosion of bodily physical effects. Sugar is pumped out of your liver into your bloodstream. Your blood rushes from internal organs to the skeletal muscles. Acid pours into your spine. That happens every time you overreact. In other words, what happens is your body gets charged for what is called "fight or flight." It gets ready to flee, to react, and that is very good, because there are some situations where you need it. If you are out in the forest and a big bear comes up, it is a good idea for that to happen to you. You have got to be able to react and save your life. But if you are blocked in traffic on a busy expressway and you start thinking about the things you have got to do, and the papers you have got to grade, and the work you have got to do when you get home, then it is not an appropriate reaction to get ready for fight or flight. You just perked your ulcers. You get hurt.

Stress is critical. There is increasing evidence that a person's attitude even after being diagnosed as having cancer is important to eventual recovery. Something happens when you believe you are going to live. Something starts happening to your body that aids the healing process, and there is evidence that if you give up, your chances go down. The ability to call on that is important. There were female cancer patients who had a pap smear, diagnosed as probably having cancer. Psychologists were doing research on it and asked the question, "How do you feel about it? What do you think your chances are?" In short, they wanted to find out what their thoughts were about it. What they found out was that of the people who felt pretty helpless about it, 65% in fact had cancer. Of the group who felt "No, I probably do not have it," or "I can win out," only 24% had cancer. That is beyond chance. And the groups were selected as being the same age, same type of pap smear; in every way controlling every other variable. The only variable they tried not to control was their thoughts.

Overreaction occurs in response to three basic areas. We overreact to the fact that we are imperfect, that we are fallible human beings. I am not opposed to reacting to that. If I get evaluated and they all say that this is the worst workshop they ever went to, I think I would be dumb not to sit down and get more feeback and try to find what is wrong. But I think I would be equally not too bright to go home to Barbara and say "Where's the knife, I've got to cut my wrists." One of the first areas we overreact to is the fact that we are imperfect.

We also overreact to the fact that other people are imperfect. And other people are, so we go around saying things like, "He shouldn't have treated me that way, or she shouldn't have done that." There is no law that says people do not get to do things. They are human beings, imperfect, but we demand that they do it differently. The thing that I think happens is that we tend to personalize so much.

The third area we get upset in is in relation to the world. My father should not have died. I should not have to do this workshop. I should never trip and stumble and fall. I should never eat food and get indigestion. The world owes me. It should not rain on me today. We overeact to the fact that the world is not perfect. But life is stressful; you cannot live without stress and pain.

Basically, there are four kinds of stress. There is reality stress. You are going to break an arm and a leg occasionally. Sometimes I go over there to use the marker, and it does not work. That is reality stress. Sometimes you are doing workshops and your boss comes in. That is reality stress. There is physical stress, which sometimes has to do with broken bones. It has to do with menopause. There is developmental stress. There is also psychological stress. That is what I am talking about today. Psychological stress has to do with imposing it either on yourself or somebody else. Psychological stress is very important. You have to learn to deal with your feelings. I will give you a quick overview of how to do that.

I will recommend the book for you to read. It was written by Harper & Ellis and is called A Guide to Rational Living. There is a new copy out called A New Guide to Rational Living. Basically, if you want to work and use this technique, you need to do about three or four steps.

Step 1 is to identify what you are feeling. Be careful about that. We could confuse a lot of feelings. Sometimes we are tense and what comes to our head is we are hungry. Identifying what you are feeling is not that easy. The confusion between certain emotions is rampant. Guilt and anger often get confused. Anger and anxiety, too. So, you have got to try and identify. That is all you do, just take your best shot.

Step 2--anytime you are overreacting it is usually in conjunction with what is called a "should" statement. Think about the last time you were angry. Think about the lady in the car and the young man who whipped in front of her. What do you think her "should" statement was? "He should have waited. He should not have treated me that way." If you could only do one thing to help yourself feel better, I would work on eliminating "should" and "ought to" from your vocabulary. So identify the should statement, because feelings come from overreactions, come from thoughts, and those thoughts contain "should" statements.

Step 3--identify the exaggeration because an overreaction, by every definition, is an over exaggeration. Very common ones are: "I can't stand it," "this is terrible," "this is horrible." There is always an exaggeration statement. I would suggest you write them down.

What do you do to change your thoughts? First, you change the "should" statement. Then you identify and change the exaggeration statement. Not "I can't stand it," but "I wish it weren't happening." Not "it's terrible," but "it's darned inconvenient." It is inconvenient when somebody whips in front of you on a motor cycle. It is unfortunate. I wish my father hadn't died. It was unfortunate, and I suffered and am still working with grief.

Two people come to see me in marriage counseling: two men, same age, same everything. They both have just gotten a divorce, and one walks in saying, "It's horrible, it's terrible, I am going to kill myself. I cannot live without her. We've been married for 20 years. I'll never find another woman." I never met a man so out of it that he cannot find another woman. Cannot stand it, cannot live, cannot function? All exaggerations that should not be. That guy is throwing his life away. The other guy comes in and sits down and says, "You know, I've been married 20 years. I wish it hadn't happened. It really hurts. I wish that the reality were different, but I'm going to deal with my grief. I'm going to go out and try to date again." Here the difference: it is the thoughts, not the reality. If there were a reality called divorce, we would all react the same way. If there were a reality called death, we would all react the same way. The very simple technique of starting to actively work on changing your cognition will make an immediate difference in your life.

There is one final point. In an area very close to you, that you are sensitive to, it will be harder to learn to be reasonable. In other areas, like traffic, you will notice it right away. You cannot have a feeling without first having it preceded by a thought. Try feeling happy, right now, without having a thought. Try feeling sad, without telling yourself something. You cannot do it. You have always got to have the cognition. The secret of managing yourself is changing in realistic ways what you are telling yourself. You have got to locate the irrational statements: The shoulds, the exaggerations. Write them down and then start making them realistic: "It's unfortunate, it's inconvenient, and I wish it hadn't happened, but it's not terrible, awful, horrible, a catastrophe." The difference is between reaction and overreaction. There is no such thing as a catastrophe unless you are the one who defines it that way.

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